

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—18TH YEAR.

SYDNEY, SATURDAY, FEBRUARY 7, 1931.

No. 6.

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LOCAL ANÆSTHESIA IN GENERAL SURGERY.

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LOCAL anæsthesia to most medical men now in practice, and to their patients, means something which is employed for removal of warts, or cysts, or for other small operations, and which is induced by spraying something out of a glass tube, or by injecting with a small needle from a small syringe a small quantity of fluid drawn from a small ampoule. Or it means, at its biggest, an injection at the side of a tooth that is to be removed, administered by a dentist.

All this is useful enough in its time and place, but it is not the thing which is attracting attention now under the same name. It is this latter that the curious and the enterprising and the ambitious man wants to know about. What can it do? How

is it done? Is it done better this way, or better that way?

Well, I can say now in the confidence of a full experience, that it is really worth while; it is something that gives our patients not only a safety, but also a comfort, never before attained, and not attainable in any other way at present. It is not a mere thing of fancy for novelty mongers or stunt workers, or for people with more optimism than sense. It is not a thing for bad surgeons,—far from it, for it may show them up—but for the better ones. It is at its greatest in desperately bad cases, but it is a thing whose function does not begin and end with desperate emergencies, for it offers something better almost everywhere. It is an improvement. It makes better surgery.

This opinion, or this conviction, has come by no sudden conversion, by no suggestion from without, but by the slow and steady accumulation of case experience. I had already had many years of

experience as a general surgeon, partly with chloroform in earlier days, and later with ether, and of course had done thousands of operations with such aids. But I wanted to test seriously the value of local anaesthesia. I wanted to know, but to know by my own knowledge, and to criticize by my own experience. I have now done, not thousands, but certainly a long way towards two thousand major operations of great variety under local anaesthesia. And there is my right to have an opinion and to speak it.

There has been a chloroform epoch, then an ether epoch. We are still in the ether epoch, but we are now on the threshold of an epoch of local anaesthesia, with auxiliaries in nitrous oxide gas and oxygen, and ethylene and oxygen. Ether will always retain an important place, but not what it has been for the last thirty or forty years.

Every doctor knows that a large number of patients shrink from the idea of general anaesthesia. Many of them shrink more from the ether than from the operation. Some shrink because of a fear that they may die under the anaesthetic; in some it is mere undefined terror, but a very large number because they have seen, or heard of, or experienced very great unpleasantness and discomfort in connexion with ether anaesthesia. Of course, some of the discomfort at times can be put down to the want of skill of the anaesthetist, but skill is not always to be had. One has to count on its frequent absence.

At all events, whatever the cause, general anaesthesia by ether is regarded as disagreeable. Medical men have to administer it, but they shrink, like others, from passing through the experience as patients. I have ventured to forecast the future. One thing that has made me bold enough to speak as a prophet in regard to this, is the strong set of the current that has already become manifest amongst the doctors. They want local anaesthesia for themselves when they have to be patients. I have operated on a very large number of doctors and their wives, and it is the local anaesthesia that brings them. They say so, and I have had many letters from them in which, after their experience, they have made the same prophecy as to the future of local anaesthesia.

SHOCKLESS OPERATIONS.

Local anaesthesia, carefully and skilfully managed, is shockless. At the end of a long and serious operation the pulse is normal, the colour normal, the respiration normal, there is no sweat deluge, no vomiting, no headache, no acute after-pain, no sore tongue, no broken teeth, no unpleasant recollection, and often no recollection whatever of leaving the ward, of the operation, or of return to the ward. There is no fear before operation, and no nightmare recollection after it. The surgeon, to borrow Crile's phrase, may be said to "steal" the operation in a large proportion of the cases among older people. The patient often refuses, at first, to believe that the operation has been done. I have seen this scores of times, perhaps hundreds of times.

The local anaesthetic abolishes pain at the seat of operation. It does not usually abolish all sensation,

since the patient knows that he is being touched. This is the reason why many writers prefer to call the condition "analgesia", since that is the strictly correct word for abolition of pain, while "anaesthesia" should involve abolition of touch sensation as well. But it would now be hard to dislodge the term "anaesthesia", which became current before the better word was proposed.

Pre-medication.

It is necessary for the practitioner to understand that all sensation is not abolished, for it supplies the reason for an important part of the technique. I mean the pre-medication by morphine and hyoscine, or by some satisfactory substitute. The mental condition of the patient must be one of calmness and quiet confidence. He must not be in a state of keyed-up apprehension or expectation of pain. The slightest tactile sensation may be interpreted as pain by any patient who is in a state of nervous apprehension. The mental attitude must, therefore, be most carefully attended to. It is as important as any other part of the technique. Dr. Farr⁽¹⁾ tells us that he succeeds in preventing nervousness by suggestion tactics carried out by a skilled nurse—a psycho-anaesthetist. I do not doubt that it is possible, but these skilled nurses are certainly rare. I have not met one equal to such a task, so equal to it that I could be sure that everything would go smoothly and easily all the time, and that the patient would never be upset, the surgeon never upset, and the helpers never upset. And if such a nurse were here and there available, we could not all get her, nor take her to our various operations.

But we can rely on morphine and hyoscine every time. We can know beforehand that things will go smoothly, and that patient, surgeon, and assistants need have no apprehension of trouble. And the drugs are always at hand, anywhere, at any hour, in any case.

But are these drugs always safe? Are there no difficulties in their use? Can we be really sure that things will go smoothly? Yes, they are potent drugs, unsafe when not used safely; so are "Avertin" and "Sodium amytal"; so are ether and chloroform; so are cocaine and "Novocain"; so are adrenalin and insulin, atropine and strychnine and digitalis, "Salvarsan", emetine and half the pharmacopoeia. It is quite certain that there are difficulties which make care and judgement necessary, as much in these as in all other potent drugs. That is what we are for. Furthermore, it must be clearly understood that things cannot be depended on to run smoothly unless we take care to make them run so by the use of our knowledge and skill gained by experience or by precept. But this knowledge is available. The people who fail are those casual gentlemen who never seem to be properly aware that knowledge and skill are not to them an inborn gift, but something they have to learn just as others have.

But when a man is willing to be careful about details of preparation, and willing to operate as he ought to operate on patients under local anaesthesia, he can

be quite confident that things will go smoothly, and of course that is what everybody wants.

However, I understand that some medical men have an impression that hyoscine is in a special way dangerous because (so it is said) cases occur in which patients betray an idiosyncrasy against it, or what comes to the same thing clinically, there is apt to be a varying potency in the drug. It may be so, but I have been unable to get any tangible information, precise or otherwise, on the point. I have seen nothing of it in my own experience. One may hesitate to speak with confidence and any authority with an experience of only ten, or only one hundred cases. But a thousand and more cases is material for a good deal of confidence. Such a statement about hyoscine is not worthy of respectful consideration without evidence, or without any opportunity of analyzing evidence, especially when it is not consistent with one's experience. That is not to contend that there is no individual variation in the physiological response to drugs. Of course there is. There may at times be considerable idiosyncrasies. Sometimes it is to one drug, sometimes to another. But we must preserve a reasonable intellectual balance.

Morphine and hyoscine are not the only drugs possible, though they are the drugs that I have studied up to the point that I know pretty well what I can do with them, and how to do it whenever I want it. At one time I gave a thoroughly good trial to paraldehyde, but by unanimous agreement of sisters, house-surgeons, and myself, it could not compare with morphine and hyoscine. It was far inferior. Within the past year or two other competitors have arisen. I refer to "Avertin" and "Sodium amytal", now on their trial. Let me quote an appreciation of "Avertin" by a recent writer⁽²⁾, an anaesthetist:

Once a patient is narcotized with avertin, only a very small quantity of inhalation anaesthesia is required to complete the anaesthesia. From the anaesthetist's point of view this is the chief merit of the drug. The patient has much more cause to welcome it. The anaesthetic is given in the ward without fuss, the falling asleep is gradual and peaceful, and the awakening equally so. Even though the narcosis has been very light, there will be no memory of anything from the time of the injection. Further, the events of the next twenty-four hours will not be remembered with any clearness, and the whole horrible business of being anaesthetized and of recovering is thus not only diminished in fact, but is minimized in retrospect.

Much the same claims are made as to "Sodium amytal" (sodium iso-amyl-ethyl barbiturate) and, I believe, quite correctly. Still, one did not need to wait for these drugs for that particular purpose. Many of us were getting the same extremely satisfactory effects years before their arrival, and are getting them still, from morphine and hyoscine, used with proper art. I may say that part of the reason why I made the above quotation was because the writer, who knew what he was talking about, referred to the experience of being anaesthetized with ether and of recovering from it as a "horrible business". It emphasizes what I have myself said a little earlier.

More recently, for a similar purpose, Willard Bartlett has recommended a one gramme (fifteen grains) dose of "Luminal", increased sometimes

to two grammes (thirty grains). This is given by mouth. I have not tried it.

The Effects of Hyoscine.

Hyoscine (also called scopolamine) is a drug which has close kinship with atropine. Like atropine, it causes a sensation of dryness in the mouth. It is tolerated by children just as atropine is, a fact that authors of text books on *materia medica* have not yet discovered. A child of seven will tolerate a dose of 0.65 milligramme (one one-hundredth of a grain) of hyoscine, as I have repeatedly found, though 0.43 milligramme (one one-hundred and fiftieth of a grain) is sufficient for ordinary use. In most cases young adults betray practically no effect after a dose of 0.65 milligramme (one one-hundredth of a grain). At about thirty years of age and thereafter, more effect is noticeable, the patient becoming calm and placid, and beyond middle age he becomes more or less somnolent. Larger doses, say another 0.65 milligramme (one one-hundredth of a grain), in patients from thirty years of age upward tend to make many patients merry and garrulous, and to exhibit symptoms resembling mild alcoholic intoxication. This dosage will often make a middle-aged or old patient wildly delirious and restless, but sometimes merely somnolent, or somnolent alternating with restlessness, with a quickened pulse and a flushed face. A patient intoxicated to the stage of restlessness is not suitable for operation by local anaesthesia. It should not be produced, but if by bad management a patient reaches this condition, he should be given a general anaesthetic, or the operation postponed for another couple of hours, or longer.

The memory is obliterated when doses are used that are sufficient to produce a somnolent condition. With small doses memory is not obliterated, but it is often dimmed, and no recollection of anything disagreeable remains, even though the patient may have made some complaint during the operation. But 0.65 milligramme (one one-hundredth of a grain) in a young adult seems to have no effect on the memory.

The effects of hyoscine are very greatly assisted by administering an adequate dose of morphine with it. I would not have either drug without the other. They seem to help one another, and though in some respects pharmacological opposites, they are really admirably suited for combination. I have experimented extensively with morphine dosage, and after trying it in all ways I have come to believe in giving a generous allowance, notwithstanding that with such dosage a certain number of patients will be found to vomit a few hours later. But the vomiting is never of much account.

Scheme of Dosage for Pre-medication.

To patients at seven years of age, give hyoscine 0.43 milligramme (one one-hundred and fiftieth of a grain) and morphine 3.2 milligrammes (one-twentieth of a grain) an hour before the operation.

To patients at twelve years of age, give hyoscine 0.65 milligramme (one one-hundredth of a grain) and morphine 8.0 milligrammes (one-eighth of a grain) an hour before the operation.

To patients at seventeen years of age, give hyoscine 0.65 milligramme (one one-hundredth of a grain) and morphine 16.0 milligrammes (one-quarter of a grain) an hour and a half before, and again hyoscine 0.43 milligramme (one one-hundred and fiftieth of a grain) and morphine 8.0 milligrammes (one-eighth of a grain) half an hour before operation.

To patients at twenty years of age, give full dosage, that is, hyoscine 0.65 milligramme (one one-hundredth of a grain) and morphine 22 milligrammes (one-third of a grain) an hour and a half before, and hyoscine 0.43 milligramme (one one-hundred and fiftieth of a grain) and morphine 11.0 milligrammes (one-sixth of a grain) half an hour before operation.

This dosage and technique are continued until the patient is about thirty-five years of age.

After the age of thirty-five, the second dose of hyoscine is omitted, and one may give all the pre-medication at a single injection one hour before the time of operation. But make a difference with alcoholics. Treat them as if fifty years of age.

To patients at fifty years of age, and up to extreme old age, give 0.43 milligramme (one one-hundred and fiftieth of a grain) of hyoscine and reduce the morphine to 22 milligrammes (one-third of a grain). In very old people, reduce the morphine to 16 milligrammes (one-quarter of a grain).

Soon after the first injection, or at latest, after the second injection, the patient is placed on the operation table, which must be well padded, the eyes are covered, the light is reduced, and quiet is strictly maintained. The patient must not walk to the operation room, he must be carried, and gently handled. The necessity for quiet must be emphasized.

It is not necessary for the patient to discard false teeth. While a meal should not be given soon before the injection, there is no reason for fasting several hours.

Before arranging the towels or proceeding to induce local anaesthesia, bandage the wrists to the side of the table in such a way that, while sufficiently comfortable, they cannot be lifted so as to interfere accidentally with the asepsis of the operation. A patient suitably prepared by pre-medication never complains about this.

The injection of the local anaesthetic, except for small areas, should be done before the arrangement of the towels and the final preparation of the skin, and usually before the surgeon puts on his gloves, especially when injections are to be made at a distance from the actual field of operation. The utility of these remarks is demonstrated when one comes to make the injections preparatory to a radical operation for malignant breast. The process in this case takes thirty-five to forty minutes, and is done partly behind, partly above, partly in front, and partly below, involving nerve-blocking of seven intercostal nerves behind and of the brachial plexus above, field blocking across the shoulder and clavicle, down the other side of the sternum, across the epigastrium, and along the eighth rib, and some infiltration beneath the pectoral muscle. In such cases it is much better for an assistant to carry out the injections, sparing the surgeon who is to operate.

If a gall bladder operation is to be done, never attempt to use the transverse block provided in most tables for raising the back. It is a barbarity, and hurts. Use a cushion.

Induction Methods.

Apart from contact analgesia of mucous membranes, which is not dealt with here, there are three modes of producing analgesia for surgical purposes, all of them produced by injecting with syringe and needle.

The first is local infiltration of the site of operation and its immediate vicinity with the solution. This is the original method, antedating the others by many years, and it is the one to which the term "local anaesthesia" most properly belongs. It has been called "terminal anaesthesia" by Braun, because the action of the drug is exerted on the terminal portions of the nerves. It demands less anatomical knowledge than the other methods. It is used by me at some part of almost every operation, whether I am using the other methods or not. It is not used on the abdominal viscera, in the joints, or on the brain. Being used with adrenalin, this injection has the property of controlling the capillary bleeding, which is a great advantage. Also, by the moderate distension of the tissues that it produces, it assists in the definition of anatomical structure. Some surgeons seem to find confusion instead of help in this physical condition, but I believe most men would agree with me.

The second and third methods are field blocking and nerve blocking, respectively. The term "regional anaesthesia" includes both of these, and "conduction anaesthesia" usually means trunk nerve blocking.

Field blocking is carried out by running a barrier of injection across the path of the sensory nerve supply of the area which is involved in the operation. It is often used, and is employed, for example, in abdominal surgery, a line being run below the costal margin on either side to protect the field of an upper abdominal incision. It is usefully employed in operations for hydrocele. Some use it for appendectomy and hernia operations. Sometimes it is employed in the limbs by infiltrating a cross-section. By a cross-section block above the wrist, analgesia of the carpus and hand can be secured. Personally, with any field block, I like to infiltrate the site of operation too, because of the effect on bleeding.

Though the third method is called nerve blocking, it would really be just as correct to describe the second method as nerve blocking, but it is convenient to have conventional names. Therefore we usually employ the term to mean the blocking of trunk nerves or plexuses. No one can do major surgery under analgesia to any considerable extent without frequent resort to this method. The technique, to the uninitiated, sounds difficult, and the anatomical knowledge required may seem considerable, but it is not as difficult as some may think. With a little practice one soon acquires a good working knowledge of the art. I know this from my experience in teaching resident medical

officers and others. They pick it up easily. Of course, before one can learn one must have the disposition to learn. But anybody who has learnt to be reasonably competent to carry out an operation can learn, with very much less effort, to be competent in the technique of blocking nerve trunks. But he must be a man who is willing to attend carefully, patiently, and thoroughly to detail. This is necessary in all forms of local anaesthesia, but it is also necessary in operating.

Spinal anaesthesia is a special form of nerve blocking. I am not including it in my present review, because I think the other methods, when they can be used, are much safer, and they are not liable to such untoward complications as collapse and post-anaesthetic headache.

The technique of most nerve blocking procedures is repeated so often that it soon becomes very familiar, and even when it is a relatively infrequent injection it does not trouble a man who is used to the general method, especially if he is a practising surgeon.

After all, there are not many special block injections to learn. Of the cranial nerves, there are the maxillary and the mandibular, and lingual and inferior dental branches of the mandibular. In the neck are the cervical plexus and the brachial plexus; in the thorax the intercostal nerves; in the abdomen the anterior splanchnic injection of Braun; and for the perineum the parasacral block of Braun. There are a number of other special block injections which need not be learnt. For example, the paravertebral, which is not to be recommended because it seems to be more risky than a general anaesthetic. The posterior splanchnic also seems to have risks attached to it, besides being awkward to carry out, while the anterior splanchnic, which I recommend, has no casualty record. I have given a good trial to all the sacral methods, and in my experience the one which I have specially mentioned is much the best. In this, the nerves are blocked in the hollow of the sacrum. The details of technique should be studied in a good text book such as that of Braun or de Takäts. I do not recommend Labat's book because he sticks to the older methods and does not describe Braun's much better methods—possibly because he is not a surgeon and Braun is.

I do not recommend the ordinary unmodified Kuhlenskampff method of blocking the brachial plexus, which is the one given in the books. It is a disappointing method. In the original technique the plexus is located by provoking paræsthesia or painful sensation in the area of distribution through the excitation of the nerves by the point of the needle, or by passing a weak electric current through the needle to excite muscular contractions; then from five to ten mls of 2% "Novocain" are injected; in a few minutes the analgesia is said to be induced, though I have not found it so. The technique recommended by Livingston and Wertheim⁽³⁾ is much more satisfactory. I give it here because the information is not generally accessible. The needle is introduced in the same way through a small preliminary wheal a little above the middle of the clavicle (I go about a finger's breadth above), and posterior (or external) to the external jugular vein,

while the chin is raised and turned to the opposite side and the arm down the side. Some think it better to make the patient sit up. The needle is passed in a direction backward, inward, and slightly downward, in a line which if projected would strike the spinous process of the second dorsal vertebra. The point is made to seek and find the first rib. This is the guide to the plexus. Care is taken to see that the needle is disengaged from the bone, and from twenty-five to thirty mls (I use twenty-five) of 2% "Novocain" in 1 in 200,000 adrenalin solution are then very slowly injected to form a pool amongst the cords of the plexus. After this, wait at least fifteen minutes. As I have already suggested, the best plan is to do the injecting before getting the field of operation ready, so that time is not wasted in the waiting period. It is not necessary or desirable to have more than the customary low strength of adrenalin in the solution.

Men in general practice, wherever they are, will probably find frequent use for a small nerve block suitable for work such as examining, suturing, and dressing wounds, for incising infected areas, or amputating infected fingers. For these purposes it is easy to block the ulnar, median, and radial nerves at the wrist. Once learnt, it will not be forgotten, because it will be used often. One should learn also the art of blocking the digital nerves as well as infiltrating the fingers, employing (as I do) both methods in combination when it seems advisable. One may use this for removing splinters, for amputating part of a finger, for removing finger-nails, or any similar work. Never use strong adrenalin concentrations when infiltrating fingers. It is said that gangrene of the finger has followed local infiltration, and that is not surprising. I believe it would sometimes occur if certain commercially compounded preparations were used in this way. They are too concentrated, and may be dangerous to use.

LOCAL ANÆSTHESIA FOR REDUCTION OF FRACTURES.

It will be of advantage to give here another technique which is not yet incorporated in the usual text books. This is Böhler's⁽⁴⁾ technique for injection of recent fractures for reduction. He is a great authority on fractures, and he gives the method high praise, saying it is far superior to general anaesthesia, and that he has used it in over three thousand cases. According to Böhler, it is so efficacious that after an injection is made the patient should not be left unattended because owing to the complete absence of pain he may move the limb and thus convert a simple fracture into a compound one. Remember that the proper time for reduction of all fractures, without any exception, is immediately. Never wait for a skiagram if that involves any delay. The skiagram can come after, and will often be more useful after. A sufficiently good provisional diagnosis can be made without it in a large majority of cases. With Böhler's technique, however, an X ray examination can be made under local anaesthesia induced for reduction when the opportunity exists. I am not giving a lecture on fractures, but I cannot pass this occasion

without condemning the practice of waiting. It is one of the first principles of fracture treatment to regard treatment as in the highest degree urgent. I do not mean first-aid treatment. I mean the proper replacement of the fragments and the institution of the best means for keeping them in place. Get a skiagram if you can do so at once, but act at once, skiagram or no skiagram. Böhler's method presupposes that the surgeon is using surgical principles and wasting no time. Böhler's instructions are to paint the skin with iodine, raise a preliminary wheal with a fine needle, and then pass a larger needle into the blood pool bathing the ends of the fragments. Inject four or five mls, take off the syringe, and see if red-coloured fluid escapes from the needle. If it does, inject fifteen to twenty mls, if not, try a new place. If two bones are broken, inject each place separately. Böhler finds he can use fifty to sixty mls of 2% "Novocain" without danger, and he says analgesia is induced very rapidly. He does not say anything about adrenalin, but I would certainly advise it because then one can be sure that the analgesia will be prolonged for at least two hours. I am surprised to find Böhler stating that he gets analgesia lasting two or three hours without it. In this type of induction the blood must dilute the strength of the solution injected, and so 2% in the syringe would be less than 2% in the blood pool. However, Rice⁽⁶⁾ an American who has practised the same kind of induction says he gets sufficiently good results with injection of a 1% solution, but it takes fifteen minutes to act. Rice strongly recommends the addition of adrenalin. I would prefer to use the 2% solution, and would use adrenalin. An adrenalin concentration of 1 in 100,000 would be appropriate for this type of work. In fractures of the lower limb, patients are usually brought to hospital and admitted, and there may be opportunity for a dose of morphine and hyoscine as the very first step. Even for a forearm fracture it would be an advantage. Certainly it calms the fears of the patient, and it may also save a lot of useless argument, and if there is one, it confers the advantage on the person giving the advice—which is all to the good of the patient.

If, however, by accident, by failure of duty, or by lack of surgical knowledge or judgement, the fracture is more than a few hours old, the method above described is likely to be insufficient. In such a case, in addition to an injection into the blood pool, there would have to be a very copious injection of 0.5% "Novocain" around the bones close to the fracture. This is, as I know by experience, a thoroughly reliable method. It gives an absolutely painless reduction. I have found it satisfactory for open reduction when closed methods have failed.

Now note that if, through lack of early opportunity, a skiagram has to be taken some hours after you have painlessly dealt with the fracture, and the limb is by that time in plaster of Paris or otherwise fixed up, the patient is not on that account any worse off than he would have been. A second local injection can always be given if necessary, and without any additional risk, as Böhler himself advises. I believe this application of local anaesthesia is likely to cause

a great improvement, much needed, in fracture results, and it will certainly diminish greatly the suffering of patients.

I have put Böhler's method to the test of personal trial in a sufficient number of cases to satisfy myself that it does what is claimed for it, and my tests have been severe. I advise every general practitioner and every hospital casualty department to keep in hand a stock of gelatine capsules ready filled with 0.6 gramme (ten grains) of "Novocain". This quantity will make thirty mls (an ounce) of 2% solution, enough to inject both bones at the sites of fracture in a forearm, or both malleoli in the lower limb. A fracture of the femur or of the shaft of the tibia would require the whole to itself. Rice advises similar treatment for dislocations, with injection of the joint and also of the joint capsule. I would remind the practitioner making an injection at the site of a Colles's fracture not to forget that the styloid process of the ulna is commonly fractured as well as the radius. The injection should be made as soon as possible after the patient arrives. Adrenalin can be made up by dissolving Burroughs, Wellcome small-size adrenalin "soloids" or Parke, Davis's adrenalin hypodermic tablets in sterile water and mixing a sufficient quantity to make the right dilution with boiled solution of "Novocain" in normal saline solution, each ingredient being calculated to give the right strength. For these emergencies it may be best to make up a 1 in 1000 dilution of adrenalin (similar in strength to *liquor adrenalini*) and add five drops to an ounce of 2% "Novocain" solution. The method of getting the right strength should be calculated once for all and copied into a note book, or on a blank leaf in the pharmacopœia.

PAINLESS SUTURING OF WOUNDS IN CASUALTY PRACTICE.

Fractures are not the only casualties in which injections of "Novocain" and adrenalin come to the aid of the general practitioner. By the use of local infiltration it is now easy to suture up wounds of the skin without causing pain. If this can be done, why not do it? Use the finest kind of needle, at least for the initial injection, and for this purpose the slenderest needles are Schimmel needles, as a rule. Insert very carefully and gently, first making an intradermic wheal, and then inject beneath the skin on each side throughout the length of the wound. In some cases it may be suitably done from within the wound. Do not use "Novocain" stronger than 0.5%, and do not use adrenalin stronger than 1 in 200,000, except for some special reason. Inject liberally, and do not be in a hurry. Wait patiently and cautiously until you can see there is adrenalin pallor in the part. Then it is safe to suture. Do not withhold this boon from your patients. It is cruel to cause unnecessary pain.

GENTLE TECHNIQUE IS REQUIRED IN OPERATIONS: NO MUSCLE-SPLITTING.

It is necessary to say something of the technique of operating on tissues prepared by local anaesthesia. The rough unnecessary violence that is habitually employed by many operators, and even recommended

in text books, must not be practised, and cannot escape with the same immunity that it enjoys at present under ether anaesthesia. A better operating technique becomes necessary. The scalpel must be sharp, preferably a wafer blade. It must dissect with a light, effortless touch, and must not be mistaken for a scraping implement. Avoid scraping and scratching. Cut, do not tear, do not split, do not stretch, do not pull. Always cut, and cut lightly and surely. Crude tissue insults are out of order. Muscle-splitting operations are tissue-rending operations, and produce wincing and uneasy stirring of patients even when they are well injected and well drugged. Therefore, in doing an appendicectomy, never follow the common practice, advised in text books written by men who know no better, of "splitting" the external oblique or the internal oblique and *transversalis*. Please do not think that text books are written by supermen. They reflect current or past practice, good, bad, or otherwise, and often much of it is not good and not permanent. But nevertheless, the power of the printed word is so great on the mind of many that it is irresistible. They cannot realize that it may be wrong. But it is wrong to split fascia; the right method is to slit it.

Again, when swabbing, have no wiping of the wound. Press the swab down and remove it. Leave no untied vessels. Clamp every little bleeding point, and tie it carefully. In the abdomen, avoid packs as much as possible, and it is often possible to avoid them, or at any rate to have very few. I have read about a tendency to reactionary bleeding after local anaesthesia. That is all I know about it, because I have never seen it. But I can believe it as likely after certain types of operating, and especially when relatively strong solutions of adrenalin have been employed, and these strong solutions are widely used in minor surgery. The ready-mixed tablets and ampoules sold by drug houses for minor surgery usually contain four times the proper strength of adrenalin when made up according to the directions given. Unnecessarily strong concentrations of adrenalin will mask the presence of vessels that are large enough to bleed later if not tied. Besides, there are many operators who do not take great pains to secure and tie every bleeding point.

ARMAMENTARIUM.

Let us discuss now the tools we are to use. For satisfactory work we require the most suitable instruments, and some are much better designed for their purpose than others. Some of the apparatus supplied by makers is anything but suitable, especially the needles.

First let us take the needles. These should be made with a suitable catch to engage with the nozzle of the syringe so that it cannot blow off and is water tight. Fine needles are required for the painless production of the initial endermic wheal, and in my opinion a butt adapted for taking Schimmel needles should go with every syringe. Schimmel needles can be used once and then thrown away, or a broken needle can be at once replaced. But these needles should be used very cautiously, since they may break

if the leverage of the weight of the syringe acts on them. No needle, of this or any other type, should be pushed in right up to the hub. When a needle breaks, it breaks always at the hub, and there should always be enough of the needle projecting out from the skin to permit of its easy removal in case of breakage.

Besides the fine needles for producing the initial wheal in the skin, one requires a set of longer needles, of various lengths up to twelve or thirteen centimetres. These should be very slender and should be flexible, so as to be able to bend without breaking. This is most important, and I am sorry to say that the needles supplied by English makers, as far as I know them at present, cannot compete with the needles of Continental origin. They are not flexible, they are too short, and are of a large, cruelly coarse calibre. If I had to use such needles, I would give up local anaesthesia. The fine, long, flexible needles supplied with Continental syringes are excellent, and are obviously made of a suitable kind of steel.

I have used a number of different makes and sizes of syringe. The ordinary "Record" type syringe is not satisfactory because it blows off during injection and is a perpetual nuisance. There is, however, an adapter, sold for using with an ordinary syringe for local anaesthesia, and this works quite well, though it does not fit all needles. Syringes made for the purpose have a special fitment to prevent blowing off, and this is usually a bevel catch, holding the needle firmly, but very quickly engaged and disengaged. I have used ten, twenty, and thirty mil sizes, and any of these sizes will do well. Labat's is a ten mil syringe with glass barrel, and is very satisfactory. On the whole, I like it best of all, but the outfit costs more than others, and it does not contain an adapter for Schimmel's needles. An all-metal syringe sold by an English firm as Moynihan's pattern is an excellent syringe, but do not use the needles supplied with it. In Sydney we can have better needles fitted into the old hubs, and then it is altogether satisfactory. I do not like Braun's syringe. It is an all-metal syringe with fibre disks on the plunger, and is boilable, but the fibre disks give constant trouble, making the plunger either too stiff to use or too loose to use. Moreover, the system adopted for attaching the nozzle of the syringe to the needle is clumsy and inefficient, though the adapter mentioned above can be used instead of this. A Sydney firm has altered for me a "Record" syringe, converting it into a satisfactory local anaesthesia syringe at a very moderate cost.

All-metal syringes can be boiled, but do not boil syringes with glass barrels and metal mountings. They can be prepared in lysol and water—not pure lysol. Pure lysol is not the active germicide that many imagine it to be; it requires water to activate it. Methylated spirit is also used a good deal, but I am not sure of its value.

I strongly recommend an invention of my own for the anterior splanchnic injection, used in abdominal work. This is a special instrument made by cutting off the solid end of a Wheelhouse staff. It is used as a director, being held firmly down against the body of the first lumbar vertebra by the handle while the point of the long needle is slid down the groove

safely to its destination. A special needle for the anterior splanchnic injection has been invented by Dr. Finsterer. Dr. S. F. Lynch, of Sydney, introduced it to my notice and presented me with one. I have used it constantly ever since, and I should not like to be without it.

METHODS AND INJECTION TECHNIQUE.

For producing analgesia I use "Novocain" only, combined with adrenalin, and dissolved in normal saline solution. I understand that "Novocain" is to be introduced into the forthcoming new edition of the British Pharmacopœia under the name of aethocain. It is called procain in the United States, and *néocaine* in France. The drug can be bought pure in powder form, and it is also marketed in weighed powders and tablets compounded with adrenalin ready for extemporaneous use. Adrenalin can be bought as *liquor adrenalini* in 1 in 1000 strength, or in small tablets which can be mixed with normal saline solution for extemporaneous use. Those who wish to use the pure "Novocain", or aethocain, powder for private operations can weigh out the bulk powder into half-gramme powders, or any other weight, and put them into gelatine capsules, but different weights should be in different sizes of capsule, and in any case capsules should be kept apart and in properly labelled boxes so that there can never be a mistake. In the operation room one or more capsules can be emptied into normal saline solution and sterilized as far as may be by boiling before mixing with adrenalin. I say "as far as may be" because spores escape destruction. The boiled solution should be allowed to cool before mixing, because adrenalin is destroyed quickly by boiling, and seems to be weakened even by very hot water. The synthetic adrenalin is said to withstand boiling better, but synthetic adrenalin is much weaker than the natural product. I have used it, but not in recent years.

If we use Burroughs, Wellcome and Company's "soloids" (of which there are two sizes), or Parke, Davis and Company's hypodermic tablets of adrenalin, we can make up a solution to mix as required with a "Novocain" solution. One could make up small quantities of 1 in 1000 solution (the same as the strength of *liquor adrenalini*) and use drops of this as one uses *liquor adrenalini* and as I have recommended for fracture work, but it seems to me better at ordinary operations to make up a solution of adrenalin twice as strong as what it is intended to inject, and another solution of "Novocain" twice as strong as is to be injected. Then if equal parts of these two solutions are mixed, we get the right strength for use. Thus if we have a 1 in 100,000 solution of adrenalin in normal saline solution and a 1% solution of "Novocain", a mixture of equal parts will give a 0.5% solution of "Novocain" in 1 in 200,000 solution of adrenalin. After all it does not matter whether we do it one way or another, so long as we get it right. But we should never allow ourselves to make up our quantities by a haphazard mental calculation on the spot. We should keep a note book with a properly calculated scheme adaptable to anything we may want, and this should be at hand for every occasion. And

unless we have a fixed unalterable daily routine, we should always pre-arrange our procedure for every part of the induction. This plan should be written down and referred to for checking. At an operation, the various solutions, if there are different strengths, should be stood on top of pieces of note paper on each of which is written the strength of the solution in the container, and it is well in some cases, as in a breast operation, to state what injection it is intended for, and how much for each. For example, how much for each intercostal nerve. If *liquor adrenalini* is used, we should be sure how many drops are required for each quantity of "Novocain" solution.

Another way is to use the powders or tablets ready compounded for extemporaneous use, but with these there are difficulties when we want to use such strengths as 2% "Novocain", because the solution will then contain an unnecessarily strong concentration of adrenalin. This difficulty must be overcome, and so one finds that it is desirable to keep a stock of a pure "Novocain" powder in capsules containing half a gramme, and also a stock of adrenalin tablets, even when we ordinarily use the commercially marketed compounded powders or tablets. If we are thus provided, we can manage very well.

Tablets of "Novocain" compounded with adrenalin must not be boiled, and it may be objected that they are not completely sterile. The same applies to adrenalin tablets. But although tablets may be able to yield growths of sporing organisms, the chance of contamination with pyogenic organisms is almost unimaginably remote, because only spore-bearing organisms could survive the conditions. Boiling does not sterilize spores. We could probably grow that ubiquitous organism *Bacillus mesentericus* nearly as well after as before boiling. Tablets are at least as sterile as the catgut used at the operation, unless it is certain iodized catgut. For fifty years surgeons have cherished the belief that they were using sterile catgut, and sterile catgut only. They have been extremely watchful and immensely careful, they have believed they were consistently practising aseptic surgery, and they have obtained very excellent healing. And now it seems that all this time they have been deceived. All this time they have been planting germs in the tissues, and those not dead ones. W. Bulloch⁽⁵⁾ has unveiled the truth, and has shown that, with certain special exceptions, practically all catgut, however prepared, will yield a stinking growth of gas-forming sporing organisms if the chemical antiseptic is carefully removed from the gut. These organisms appear to be derived from the intestine of the sheep whence the catgut came. *A priori*, one should expect gas gangrene and tetanus to be a common result of operations. But *a priori* expectation in this case is not verified by experience. Nevertheless, if I had to plant spores in the tissues, I would not choose those of catgut bacilli. I would prefer those that may be resting in a tablet.

The Strength and Quantity of Solution to be Injected.

The standard strength of "Novocain" used for infiltration of the tissues should be 0.5%. This is

amply sufficient, but the quantity of solution should always be liberal, and the field of infiltration should spread widely beyond the incision, both in depth and breadth. When giving an injection, make first a small wheal with a fine needle by endermic infiltration, and then insert the longer and larger needle through the patch of analgesia made by the wheal. Introduce the needle without the syringe to the full length desired. Watch to see that blood does not escape. If none comes, apply the syringe and then slowly withdraw, compressing the piston and injecting the fluid as the needle is withdrawn. Some make the injection while pushing the needle forward, and at first I used to do it myself, but I like now to put the needle in to its full length first and watch to be sure no blood comes through. As a matter of experience, one finds that the vessels escape, and one does not get bleeding. With the other way of making an injection, if the needle did enter a vein, it might inject solution into it. In injecting, one may allow, say, one mil of fluid for each centimetre the needle is withdrawn.

When we are using low concentrations of "Novocain" and adrenalin, and injecting slowly, and, of course, not into a vein, we need not be much afraid of over-dosing. In an ordinary operation such as an appendicectomy or cure of an inguinal hernia, one will probably use less than one hundred mils, but a cholecystectomy may use up twice as much. A radical breast operation will perhaps use up approximately one hundred and fifty mils of 0.5%, one hundred mils of 0.75%, and twenty-five mils of 2% solution. The largest quantity I have ever used was five hundred and ten mils of 0.5% solution (equal to seventeen ounces) for an immense ventral hernia in a 19-stone man, but I am sure I could do it now with much less.

For field blocking, the 0.5% solution of "Novocain" is amply strong enough, but one must be careful to see that the wall of anæsthetic solution injected across the nerve paths is of good depth and of sufficient thickness.

For nerve blocking, use 2% "Novocain" for the cranial nerve trunks and for the brachial plexus. Some advise 1% for the cervical plexus, but in my experience 0.5% is ample if terminal infiltration is used in addition, as is my practice. For the blocking of intercostal nerves, practised in thoracotomy operations and radical breast operations, I have used both 0.5% and 0.75% solutions. Perhaps it is better to use the stronger, and there should always be a sufficient quantity, say twelve to fifteen mils to each nerve.

What Concentration of Adrenalin to Use.

There are good reasons for not making the concentration of adrenalin any higher than is necessary for the purpose to be served. In the first place, adrenalin is a very potent drug, and in an accidental over-dose with "Novocain"-adrenalin, the symptoms would probably come more from the adrenalin than from the "Novocain", unless the "Novocain" itself happened to be far too strong. Accidents of this sort might happen from injection direct into a vein or into the spinal canal of a quantity of analgesic solution. These things appear to have

happened in the course of the paravertebral and posterior splanchnic techniques.

So we must not be careless about the strength of the adrenalin. If we use low concentrations and inject slowly, we can be very generous in injecting, and it is an advantage to be liberal if we can do it safely, but one cannot do so safely with stronger solutions. At first, I used to work with adrenalin at a standard dilution of 1 in 100,000, but later on I took to using 1 in 150,000, and in the last two years I have gradually adopted what I have come to think is the best plan, namely, to adapt the concentration of adrenalin to the vascularity of the tissue into which it is injected. One needs more in some regions than in others. The concentration I use and recommend is 1 in 200,000 for all parts of the body below the clavicle, 1 in 100,000 for the neck and face up to the brow, and 1 in 75,000 from brow to occiput, or zygoma to zygoma. Sometimes, as in plastic work, 1 in 75,000 is more suitable for the face. In operations on toxic goitre it is recommended to avoid adrenalin altogether, though I have done a few with a 1 in 500,000 concentration, and these went very well.

How to Begin.

Those who desire to adopt local analgesia technique for the benefit of their patients and their own satisfaction, must discipline themselves. First of all, they must be resolutely patient, and they must have sufficient sense to realize that they do not begin at the top, with nothing to learn, but with much to learn. It is not really difficult, but it does need study and practice. It is not fair to local anæsthesia, and not fair to the patient, for a beginner to start at once with difficult major surgery. One should become expert in one thing before trying another, and should do minor work before major, and in major work should aim at becoming proficient in ordinary cases so as to be as sure as possible of giving patients in desperate straits their best chance, when desperate conditions come along, as they certainly will. Therefore, lose no opportunity of becoming expert in ordinary gall bladder operations under local anæsthesia, also in gastric work, in "interval" appendicectomies, and so on. Amongst other things learned in this period will be the more refined and gentle technique of operating that is required. Work will be slowed down. There will be brilliant surgery, but a more genuine kind than the ruthless butchery that some imagine to be surgery. That which is merely operating will have its scope diminished.

Another thing that will repay attention is some personal study of the art of preparation, including pre-medication. In addition to all this, the man who is a real trier cannot do without a good text book, and he should give this book careful study, without regarding it as necessarily inspired.

Types of Patient Unsuitable for Ether.

There are certain types of patient in whom ether anæsthesia is so hazardous that it greatly diminishes their chance of survival, especially if the anæsthesia has to be at all prolonged. Such are very old people,

or those who are starved, weak, or cachectic, others are those suffering from asthma, bronchitis, and similar conditions, and people suffering from dangerous cardiac lesions. My oldest patient has been a woman of eighty-five who underwent a radical operation for malignant disease of the breast, whose pulse and general condition was as good at the end as at the beginning, who had a shockless operation and an ideal convalescence. My youngest patient has been a child of two with inguinal hernia, when all went well and smoothly.

It must not be imagined that embolic pulmonary complications do not occur after local anaesthesia. I have seen them, and I see no reason why they should not be just as common after one type of anaesthesia as another. But we shall avoid inhalation pneumonia, which is one of the risks of ether anaesthesia, and, to some extent, of all general anaesthetics.

Operations Suitable for Local or Regional Anaesthesia.

As for the extent of the field suitable for one or other form of local anaesthesia technique, one can say that at least 75% of the major operations of general surgery can readily be done that way, and probably the percentage will be extended. Every year of one's experience seems to enlarge the field.

Acute inflammatory conditions are not usually suitable for local infiltration. Some may be suitable for regional anaesthesia, but not suitable for infiltration at the seat of inflammation. It should be noted that the injection of a local anaesthetic into an inflamed area may cause severe pain, and the hyperæmic tissue may refuse to respond to ordinary strengths and dosage of the drugs.

On two occasions I have found it easy to discover and secure the bleeding point in secondary hæmorrhage following the separation of the sloughs after the cautery operation for hæmorrhoids. This is understood to be difficult under ether anaesthesia.

I have no personal experience, but mastoid operations are said to be unsuitable for local anaesthesia, in part, perhaps, because the region is apt to be in a state of acute inflammation.

With the above exception, all scalp, skull, jaw and face operations are very much better done under local anaesthesia. They are much easier, they incur much less hæmorrhage, they are very much safer, and they provide a more comfortable recovery to the patient. The same may be said of operations for malignant disease of the tongue and of the lip, and block dissections of glands in the neck, or any operations in the neck. Laryngectomy should never be attempted by any other method. To subject a patient to that operation under ether anaesthesia is a crime against the patient and a crime against surgery. One can go nearly as far in regard to operations on the thyroid. Ether is crude, primitive, and antediluvian for thyroid operations.

Passing to the upper limb and chest, there is practically nothing we cannot do, if we wish, under local anaesthesia, and much of it is better done that way. By degrees, I have come to the point at which I prefer to do nearly everything in the upper limb and thorax, for the patient's sake, under local

anaesthesia, and I can recommend others to do the same. I have now done twelve shockless radical operations for cancer of the breast by this method, many of them in patients who were too old and feeble to permit of ether anaesthesia. The oldest of these was the lady of eighty-five, already referred to. These patients at the end of the operation seem to be as well as when they started, and go back to bed with the same steady pulse of 80 or so. I have given accounts of the first six in a recent number of *The Journal of the College of Surgeons of Australasia*. All of them were completely successful, and the six done since have been in every respect just as good. I have been glad to hear that one of my colleagues who has assisted me in some of the breast cases has made the venture and done one himself with equally complete success. So can others. I say that it is not right and not fair to deny to old and feeble women the advantage of operation by local anaesthesia. They are so entirely different after such an experience that argument is waste of time.

I have had one case of disarticulation at the shoulder joint. This case was also described and illustrated (by a photograph) in the above-mentioned article in *The Journal of the College of Surgeons of Australasia*. It was done for malignant disease, and while it may be said that the operation and the local anaesthesia went off very well, the patient died five days afterwards from pneumonia. He was a man of sixty-three, and if he was to have a chance, it could only be with the help of local anaesthesia.

I am satisfied that for empyema, hydatids of the lung, transthoracic hepatotomy and all similar operations, local anaesthesia should always be the method of choice. I have done a large number of operations of the kind with this form of anaesthesia, so I speak with no lack of experience.

Kidney operations I have never tried with local anaesthesia. The reason has been because the analgesia is induced by the paravertebral technique, and this type of induction is not without a casualty list, besides being very tedious. That a method should be tedious is a small matter, but one hesitates more when one finds that its record makes it look more dangerous than ether.

Local anaesthesia is conspicuously successful in operations on the upper part of the abdomen. For gastric work it is far superior to ether. One can do long operations on the feeblest of patients without shock or unpleasant after effects. One has only to see a gastro-enterostomy or a partial gastrectomy done by this method to realize what a wonderful help it is in this class of work. As to gall bladders, one can always manage them with complete success, though in a very obese patient the technique is a little troublesome, though that applies to operations under ether also. In bad cases local anaesthesia should always be used. Colostomies are easily done under local anaesthesia. Appendicectomy during the interval between attacks should always be done under local anaesthesia, which makes it very much pleasanter for the patient. I have not done a large number of operations in cases of acute appendicitis in this way, because I believe that as a general rule it is better not to rely on local

anaesthesia when the tissue operated on is in a state of acute inflammation. I have done some experimentally, and all went well, but one might not be successful always. In addition I have done two because ether was contraindicated.

The first was in a woman of sixty-three in a most desperate condition, with a failing heart, a feeble, irregular pulse, asthmatic, the urine albuminous, the back and legs waterlogged, the abdomen enormously distended,—and she had a gangrenous appendix. I was asked to operate by local anaesthesia because it was obvious that ether could not be given. Everything went well, she recovered, and eventually went back to her usual occupation.

The other case was one of acute appendicitis in a lady of eighty-three, when everything went perfectly. She recovered without pain, or vomiting, or recollection, and passed through an easy and comfortable convalescence.

Many operations on the female pelvic organs can be done under local anaesthesia, but surgeons will probably find it better to use general or spinal anaesthesia for extensive operations. According to reports, it is easy to carry out Caesarean section with local anaesthesia. The abdominal wall is infiltrated along the line of incision, but the uterus needs no injection. Of course, in such a case one would not use morphine for pre-medication. Paraldehyde or one of the newer narcotic drugs could be used.

Hernia operations of every kind, inguinal or otherwise, are all suitable for operation under local anaesthesia. The surgeon who is a beginner at local anaesthesia will find inguinal hernia a very good operation to experiment with. When expert at that operation, he can take others on; one at a time, until he has acquired a good knowledge of technique.

Operations on the prostate are very satisfactory with Braun's parasacral nerve block combined with infiltration anaesthesia of the suprapubic area. Plastic operations on the cervix and vagina are done with the same nerve block, supplemented with local infiltration. External urethrotomies are very much easier under local infiltration, because they are rendered comparatively bloodless. What makes these operations difficult with ether anaesthesia is the persistent oozing from the bulb, which makes it extremely hard to see properly. Haemorrhoids and other anal operations are easy to do with local infiltration around the anus and as far up as the level of the internal sphincter. Some use sacral nerve block induction methods for haemorrhoid operations, but infiltration is simple, quick, and thoroughly effective.

Major operations on the lower extremity above the knee are not suitable for local methods. For such cases one should use a general anaesthetic or spinal anaesthesia, which is really a special form of nerve block. On the other hand, I have for years past sutured all fractured patellas under local infiltration. The technique is easy. The same applies to operations on the meniscus in the knee-joint. They are extremely satisfactory, and the relative absence of haemorrhage is a great advantage.

I have usually done amputations of the leg with general anaesthesia, and an occasional one with spinal anaesthesia. One could do these operations

below the knee with local anaesthesia, though I have never tried. In the foot, everything is easy with local anaesthesia. The operation for *hallux valgus* is one I have done many times in this way.

CONCLUSION.

Finally, do not take my unsupported word for anything. Find out if these things are true. As far as may be, put them to a personal test. The best attitude is one that combines scepticism with an open mind and a desire to find out the truth. There should be a disposition to give serious attention to claims that certainly demand serious attention, if they demand any attention at all.

But why do men stick, in spite of everything, to the old routine of lower grade work, to poorer methods, more dangerous and more uncomfortable than there is any need to be? Is it not our animal psychology? Are we not all very like sheep? Like sheep, we stay in ruts and prefer ruts round imaginary obstacles, and like sheep we balk at an open gate. There is no obstacle here. The gate is open. Can a man be a first-grade surgeon when his methods are second-grade, and he is complacent?

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MEDICAL CLINICS IN LONDON AND VIENNA.¹

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IN the arrangement of this paper I have had in mind, first, the facilities for post-graduate teaching in London and Vienna which may be of interest to those who intend going abroad and, secondly, any new methods of investigation and treatment of which I had personal experience. It is impossible to deal with these subjects in any detail in the time at my disposal, but I shall try to give a general outline of the former and then refer to a few new methods or variations of old methods of investigation and treatment.²

In London the best and most systematic teaching in medicine and surgery is obtained by joining in courses arranged by certain hospitals for candidates for membership of the Royal College of Physicians and fellowship of the Royal College of Surgeons or for the various diplomas in the

¹ Read at a meeting of the Saint Vincent's Hospital Clinical Society on April 7, 1930.

² In the paper as published most of the references to treatment have been omitted.

specialties. A typical example is that for membership of the Royal College of Physicians at the London Hospital. The course is held twice a year and is limited to twenty, most of whom are candidates for membership of the Royal College of Physicians or the London degree of doctor of medicine, though this is not essential. The cost of this course, which lasts about ten weeks, is twenty guineas. It includes lectures on applied physiology, lecture-demonstrations in pathology, clinical pathology and pathological chemistry and clinical work in the wards. On three mornings a week the members of the class are allotted patients, under examination conditions, in the wards. In the afternoon they read their histories before the rest of the class and discuss the diagnosis *et cetera* with the visiting honorary medical officer or one of the medical unit—Professor Ellis, Dr. Clark-Kennedy or Dr. Russell Brain. At times their criticisms are rather damaging to one's self-esteem and are consequently very useful. The only subject not included in this course and necessary for the membership of the Royal College of Physicians is pathological histology. This can be obtained from tutors at other hospitals, such as Saint Thomas's or Saint Bartholomew's.

A similar course, though not so popular as the London, is given at King's College Hospital and this year for the first time Guy's Hospital is arranging a course to include even the microscopical work. Judging by the staff there, it should be very good, and is of the same length and at the same cost as the London course.

Arrangements for joining in these courses are made with the hospital concerned and not with the official post-graduate association, the Fellowship of Medicine. This association has an office at Number 1, Wimpole Street and provides a lot of useful information and publishes a *Post-Graduate Gazette* every month. It issues a comprehensive ticket of admission to various teaching hospitals for their routine out-patient and in-patient work, but not to any special intensive courses, which must be paid separately. The cost of the comprehensive ticket is £21 *per annum*, with correspondingly smaller charges for shorter periods.

In my opinion and in the opinion of many others these tickets are not worth while. They do not admit to many of the best hospitals and some of those to which they do admit are comparatively useless. Also within the last year some of the more important hospitals, such as Queen Square, the leading neurological hospital, which was formerly open to holders of these tickets, have withdrawn from the scheme. Consequently it is better to make one's own arrangements with the hospital for their routine work, but arrangements for the special courses may be conveniently made through the Fellowship of Medicine. Some of the special courses are very good, notably those at Queen Square, the National Hospital for Diseases of the heart and at the Brompton Chest Hospital.

The Fellowship of Medicine has also arranged a series of lectures at night for the membership of the Royal College of Physicians examination. These are arranged to suit general practitioners who cannot get away in the day time, and the lecturers are first class men. The lectures are given twice a year, but are expensive—10s. 6d. per lecture—and do not cover more than a small fraction of the subjects required.

Of course, in the near future the arrangements between the Fellowship of Medicine and the hospitals may be improved, but at present its sphere of usefulness is rather small.

As regards the general hospitals in London, the one I know best is the London Hospital. Besides the members of the medical unit whom I have already mentioned and who are full-time members of the staff, there are many first class men. Professor Turnbull is in charge of the Pathology Department—a huge institution financed by one of the "Tobacco Kings," Bernard Baron. This department is most efficiently organized and has produced a great deal of valuable work. Turnbull is given the credit for the sound pathological basis to the teaching of the best clinicians in this hospital. Amongst the clinicians the outstanding men are Parkinson, who is also attached to the National Hospital for Diseases of the Heart, Riddoch, the neurologist, Russell Brain and Donald Hunter.

The London Hospital has a very well equipped "Cardiographic Department" under the control of Dr. Parkinson, assisted by a research scholar, who receives a salary of £400 *per annum*. Besides a standard Cambridge electrocardiograph, this department has an X ray apparatus for orthodiagrams.

At Guy's Hospital Hurst gives a weekly demonstration, which is free to all post-graduates and is well worth attending. They have an interesting idea there for teaching purposes. One ward is called "clinical" and senior students and recently qualified graduates of the hospital are allowed to select cases in the out-patient department for admission to this ward for investigation. They also present their cases, if of sufficient interest, on the post-graduate afternoon. Hurst says that they find this method useful in selecting their residents.

At Saint Bartholomew's Professor Fraser's staff round is open to post-graduates by invitation and he gives men from Melbourne a particularly cordial welcome.

At Saint George's there is a weekly demonstration in neurology, Dr. Collier alternating with Dr. Feiling. Dr. Collier's demonstrations both at Saint George's and at Queen Square are the most popular in London.

I know very little of the other general hospitals, except the pathological museum at University College, which is excellent.

Four of the special hospitals interested me particularly—The National Heart Hospital, the Brompton Chest Hospital, Queen Square and the Children's Hospital in Great Ormond Street.

As we are just now organizing a new department in this hospital for investigation of cardiac disease, a few facts about the value of cardiographic methods as shown by the work at the National Heart Hospital may be of value. Two special methods are used there as a routine in investigation and in controlling treatment: (i) Electrocardiography, (ii) X ray investigation, including orthodiagrams. Unfortunately, for the present our department here will only be equipped for electrocardiograms, but later we hope that an orthodiagram will be added.¹

The neurological hospital at Queen Square is one of the best teaching institutions in London, partly because of the high standard of the staff, which includes Gordon Holmes, Collier, Kinnier Wilson, Adie, Walshe, Riddoch and others, and partly because of the wealth of clinical material available.

On five afternoons a week there are excellent demonstrations in the out-patient department, fifty or sixty post-graduate students often being present. Selected cases are often shown, but even the patients seen routinely are generally very interesting. Twice a year for eight weeks these demonstrations are supplemented by lectures on anatomy, pathology, methods of investigation and diseases of the central nervous system.

The only disadvantage of these arrangements is the absence of systematic clinical work. This can be obtained only by appointment as clinical clerk to one of the in-patient physicians. I had the pleasure of being attached for over three months to a fellow Australian, Dr. W. J. Adie. There is then great opportunity for examining large numbers of neurological cases and following their progress. Many of the clinical clerks were Americans and one was a Norwegian. The methods of investigation commonly employed include the estimation of cerebro-spinal fluid pressure and Queckenstedt's test. "Lipiodol" is seldom found necessary and ventriculography is used only in exceptional cases.

Malarial therapy is carried out without difficulty in the ordinary wards.

The Great Ormond Street Children's Hospital is practically next door to Queen Square. I did not attend any of the intensive courses there, but found the routine work quite interesting, especially Wyllie's clinic in the out-patient department, Hutchison's ward round and the demonstrations by the medical registrar in pathology.

I found the intensive course at Brompton Chest Hospital very interesting, but the arrangements for routine teaching were rather disappointing. A great deal is being done there in the way of treatment by artificial pneumothorax and by surgery.

In Vienna the organization of post-graduate work is extremely good, owing to the work of the American Medical Association, which controls all teaching in English. As practically all the teachers speak excellent English, a knowledge of German is

not necessary, though even a slight acquaintance with the language is useful in finding one's way about.

All teaching in Vienna is on a strict business basis, the teacher being paid always one pound an hour, the post-graduate paying his share according to the number in the class. Where it is possible to have a large class, such as for pathology demonstrations or skin clinics, this method is quite cheap, but as for most of the practical work the classes consist of from two to four, it becomes rather expensive. Still, the teaching is good, there is no waste of time and a lot of the work, as far as I know, is not obtainable anywhere else.

For instance, Kutchera, who is in charge of the chest section of the Wenkebach Clinic, gives practical instruction in artificial pneumothorax. The post-graduate student does several inductions and refills under his supervision and later can do any number with one of the assistants in the clinic, merely paying so much per case. At least this was the arrangement that I came to and the fees I paid went partly to the assistant who supervised and partly to the patients' Christmas fund.

Kutchera uses a very simple and inexpensive apparatus and his needles differ from those used in England. The general management of his patients is the same as at Brompton Hospital. He uses tuberculin therapy in the more chronic types of tuberculosis, but uses it very cautiously.

He thinks that gold is even more dangerous than tuberculin. The products used are "Solfonal" (Schering) and "Lopion" (Bayer), said to be less toxic than "Sanocrysin."

A series of patients has been treated by living bacilli (not *Bacille Calmette Guérin*, but some German preparations). These injections, strange to say, do not give as big a reaction as tuberculin, especially if the bacilli have been kept for some time. Hence the treatment can be used in cases with hæmorrhage. The injections are given intradermally, commencing with bacilli kept for six weeks, then some kept for five weeks, four weeks *et cetera*. Tubercles may form locally, lasting up to four weeks. There is never ulceration or regional gland involvement, even *post mortem*.

I attended also a class with Haslinger, of the Hajek Clinic, for medical laryngology. He is an excellent teacher and uses a very good "phantom" into which he fits wax models of various laryngeal conditions. He has supplied sets of these models to various institutions in Germany and America, but as he has to do each one himself he cannot turn out many sets. He has also made a very good phantom for teaching bronchoscopy, which reproduces the movement of respiration and the heart beat.

"Lipiodol" for chest conditions in Vienna is now chiefly given by a catheter introduced, after anaesthetization of the nose and throat, by one nostril through the nose and pharynx into the larynx. The catheter is placed in position by the ear, nose and

¹ At this stage of his paper Dr. Niall discussed the value of the two methods mentioned.

throat specialist and the patient then sent to the X ray department. The correct position of the patient can then be obtained and a minimal quantity of "Lipiodol" used. As a rule only eight to ten cubic centimetres are given.

Scherf, of the Wenkebach Clinic, is very interesting on electrocardiography. He has some excellent prints and has many original ideas.

I took a course with Rossler, of the Poliklinik, in fluoroscopy of the heart. He has a list of patients with various conditions, such as patent *ductus arteriosus*, calcified pericardium, Ayerza's disease, pulmonary incompetence *et cetera*, who for a small fee come up for examination whenever he writes to them. He gets one to examine these patients and others with more common conditions, clinically and then with the screen.

He also has a wonderful collection of films, including practically every cardiac condition known. The films are particularly useful in the diagnosis of congenital heart conditions.

Presser, of the Holtzknecht Clinic, gives an excellent course in X ray examination of the chest, commencing with the fundamentals, such as whether the film has been taken in a symmetrical position, with the correct penetration *et cetera*. He is extremely painstaking and his work is based on sound pathological knowledge. He also gives a course in gastrointestinal X ray examination which was particularly interesting, especially the recent work on the use of the rugæ in diagnosis of gastric and duodenal conditions. He also demonstrates the use of air insufflation following the evacuation of a barium enema for obscure intestinal conditions (1.0 to 1.5 litres of air). He uses an emulsion of barium containing magnesium sulphate to demonstrate the appendix and says that with proper technique every normal appendix can be visualized.

Dattner, of the Wagner-Jaureff Clinic, has some interesting ideas. He has devised a special method of lumbar puncture, designed, as far as possible to avoid trauma and headache. He uses a special needle of medium size which carries a smaller needle, slightly longer, inside. The larger needle is passed up to the dura and the puncture is then made by the smaller one. The smaller one has a tiny wire stilette, to test whether the puncture has penetrated the membranes. On the whole, neurology in Vienna does not reach the standard of that at Queen Square, at any rate as regards investigation and diagnosis.

Another interesting course was given by Gold, of the Lorenz Clinic, an orthopaedic institution, on X ray examination of bones and joints from the medical aspect.

Sallman, of the Allgemeines Krankenhaus, showed us a series of interesting conditions in medical ophthalmology. In one clinic for practical work on the chest, though the cases were interesting, the instructor was not satisfactory. He used to mark the patient's chest with coloured pencils to indicate the physical signs and when he had finished, the

patient always resembled an Indian in full war paint.

I think the only other clinic I visited in Vienna was Oppenheim's skin clinic, which was very interesting, but somewhat out of my depth.

I must apologize for the rambling way in which this paper has been put together, and I hope that possibly some item contained in it may be of interest or even of use.

Reports of Cases.

THE FIRST CASE REPORT OF INDIGENOUS UNDULANT FEVER IN NEW SOUTH WALES.¹

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In May of this year W. J. Penfold and H. M. Butler⁽¹⁾ reported two cases of undulant fever, one in a patient residing in Adelaide, South Australia, and the other apparently in Melbourne, Victoria. These were apparently the first case reports of locally acquired infection, but the "first case of undulant fever definitely diagnosed in Australia" is claimed by T. Storie Dixon.⁽²⁾⁽³⁾ The patient was a Maltese who had been drinking goat's milk in Malta, left on a British warship, became ill twenty-seven days out and was subsequently treated in Sydney Hospital (1908). The diagnosis was confirmed by Archie Aspinall, then Resident Pathologist, who obtained an agglutination of *Brucella melitensis* with a serum dilution of one in 60 (subsequently one in 200), and during a relapse cultivated apparently one of the *Brucella* group from the blood stream.

Both of Penfold and Butler's patients were apparently city dwellers and their occupations were respectively department store salesman and railway porter. No special contact with infected animals was claimed and the channel of infection was unknown, though the authors pointed to the widespread infection of market milk in Melbourne by *Brucella abortus*. In one case the diagnosis was made by both blood culture and the agglutination test, in the other case by agglutination alone.

The case now to be reported arose on the North Coast of New South Wales and differs in its circumstances from those above in that the patient was a dairy farmer handling aborting cattle. Aged fifty-one years, he was a progressive farmer with a fine dairy herd, a well-drained farm and modern buildings. His herd had been free from abortion until two years ago when its incidence followed the introduction of some new stock and has recurred at intervals, though without serious loss. He was accustomed to handle aborting cows himself and gave them douches. On the other hand, he rarely helped with milking, which was done by hand by his employees. He was fond of milk which he drank unboiled, but so did other members of his family. Subsequent inquiries show that contagious abortion in cattle is prevalent in the district and sometimes causes serious losses, but the disease was not known to occur in horses or pigs.

Clinical Features.

The onset of the illness was gradual, with malaise, loss of appetite and a languid feeling. These symptoms continued for a week, then he went to bed for a day, but felt better and got up next day, but was down again the following day with feverishness, bad headache, nausea and

¹ Read at a meeting of the Medical Sciences Club of Sydney and received for publication on November 11, 1930.

anorexia, and was thereafter confined to his bed. He came under direct medical treatment about three weeks from the onset, when an examination of the lungs and heart revealed nothing of note; the abdomen was soft and not distended, the spleen was not palpable or tender, there were no rose spots, the tongue was heavily coated with thick brown fur, but was moist at the tip and edges, and there was marked constipation. There was, however, no complaint of lumbar or joint pains or of profuse sweating. The temperature was usually about 36.7° C. (98° F.) in the morning, but began to rise about 2 p.m., reaching a maximum of 38.6° to 39.1° C. (101.5° to 102.5° F.) at 6 p.m. The illness continued for a further three weeks and then began a gradual lysis, the morning temperature always normal and the afternoon rise gradually diminishing. This defervescence occupied two weeks, but subsequently there was still an occasional evening rise and there was marked weakness, and his appearance suggested a severe secondary anæmia. There was also a moderate loss of weight, from 87.3 kilograms (thirteen stone twelve pounds) to 77.8 kilograms (twelve stone five pounds). Summarizing, the main clinical features were malaise, anorexia, nausea, furred tongue, prolonged pyrexia with headache accompanying the evening rise, and absence of other symptoms.

The Agglutination Test.

The blood serum was examined about the fifth week. There was no agglutination of *Bacterium typhosum* or *Bacterium paratyphosum* A or B with serum dilutions from one in 20 to one in 160 after two hours at 55° C. and after standing overnight at room temperature. All *Brucella abortus* strains available were agglutinated with serum dilutions down to one in 640, *Brucella melitensis*, however, only down to one in 80. One set of results is shown in Table I.

The strains used are well known, but it should be mentioned that the strain F.B. is Penfold and Butler's, the only existing culture from a human case in Australia, and the bovine strain is from the Veterinary Research Station at Glenfield, both kindly supplied by Dr. Hindmarsh. The table shows a distinct suggestion of a prozone phenomenon at one in ten and the titre proceeded two dilutions further after standing at room temperature overnight. The titre against the only culture of *Brucella melitensis* available was distinctly lower.

Agglutination by Normal Sera.

In view of the statement that normal human sera may in low dilution agglutinate the Brucella group, a number of tests were carried out. Three normal sera were found to give no agglutination of strains Bang 1A or F.B. in dilutions from one in 20 to one in 80. Four other sera gave no agglutination of emulsions of Bang 1A and 3

mixed together in equal parts and the serum dilutions were ranged from one in 10 to one in 1,280.

Agglutination by Serum of a Typhoid Patient.

It was thought to be of practical interest to compare the agglutination results employing the serum of a patient suffering from enteric. Dr. Lilley had isolated *Bacterium typhosum* from this patient's blood. The serum agglutinated *Bacterium typhosum* in a dilution of one in 160 and *Bacterium paratyphosum* B one in 40. It did not agglutinate *Brucella abortus* Bang 1A or F.B. in dilutions from one in 10 to one in 320. The agglutination test, therefore gave a sharp distinction between enteric and undulant fever in our hands.

Further Local Investigations.

1. A farm hand, aged thirty-three, employed on the same farm, had taken ill suddenly some four months before with headache, a slight rigor, nausea, pain in the epigastrium and fever lasting for only fourteen days. His serum gave no agglutination of five *Brucella* strains in dilutions from one in 20 to one in 1,280. His illness was unlike that of his employer in its sudden onset and short duration. It was considered to be influenza.

2. The serum of a cow which had recently aborted on this farm was submitted to the agglutination test after addition of a small drop of toluol for preservation.

Table II shows the results obtained with the use of fresh, untreated emulsions. The titre against the abortus strains was approximately the same as that of the patient, but the zone phenomenon was more definite and appeared at dilutions ranging from about one in 80 to one in 160. It was more striking after two hours at 55° C. than overnight at room temperature. It was not noted with *Brucella melitensis*, though, using formalinized emulsions, a prozone appeared at dilutions of one in 10 to one in 20, both with abortus and melitensis strains. It was suggested also that prozones were more striking when the serum was fresh than when kept for some time in toluol.

Morbidity of Undulant Fever in Australia.

The morbidity of undulant fever in Australia is by no means a settled question. Contagious abortion in cattle is apparently not uncommon and metropolitan milk supplies have frequently been found infected, so that apparently some cows in many herds are carriers. I have the permission of the Director-General of Public Health to state that abortus infection followed in about 2% of guinea-pigs inoculated with milk samples in Sydney. It is admitted that natural infection by abortus strains is not readily acquired by man, but are cases as rare as they seem to be? Only a more diligent use of laboratory methods will answer this question.

TABLE I.

Agglutinating Emulsions of Brucella Strains.	Patient's Serum Dilutions.							
	1 10	1 20	1 40	1 80	1 160	1 320	1 640	1 1280
Bang 1A.								
Two hours at 55° C.	++	+++	+++	+++	+++	-	-	-
Overnight	++++	++++	++++	++++	++++	++++	++	-
Bang 3.								
Two hours at 55° C.	++	+++	+++	+++	+++	Tr.	-	-
Overnight	++++	++++	++++	++++	++++	++++	++	-
Copenhagen.								
Two hours at 55° C.	++	+++	+++	+++	+++	Tr.	-	-
Overnight	++++	++++	++++	++++	++++	++++	++	-
F. B.								
Two hours at 55° C.	++	+++	+++	+++	++	Tr.	-	-
Overnight	++++	++++	++++	++++	++++	++++	++	-
Bovine (Glenfield).								
Two hours at 55° C.	++	+++	+++	+++	++	+	-	-
Overnight	++++	++++	++++	++++	++++	++++	++	-
Melitensis.								
Two hours at 55° C.	++	+++	+	-	-	-	-	-
Overnight	++++	++++	+++	++	-	-	-	-

TABLE II.

Brucella Agglutinating Emulsions.	Cow Serum Dilutions.							
	1 10	1 20	1 40	1 80	1 160	1 320	1 640	1 1280
Bang 1A.								
Two hours at 55° C.	+++	+++	+	-	-	+	++	-
Overnight	++++	++++	+++	+	+++	++++	++++	+
F. B.								
Two hours at 55° C.	+++	+++	+++	-	-	++	++	Tr.
Overnight	++++	++++	++++	++	+++	++++	++	-
Melitensis.								
Two hours at 55° C.	+	+	+	++	++	+	-	-
Overnight	+++	+++	++++	++++	++++	++	-	-

Summary and Conclusions.

1. Apparently the first case of undulant fever reported in Australia was of foreign origin, and the diagnosis was made by T. Storie Dixon and Archie Aspinall (1908). The infection was probably due to *Brucella melitensis*.

2. The first indigenous cases were reported by W. J. Penfold and H. M. Butler, and the infection in these cases was probably due to *Brucella abortus* (1930).

3. The first indigenous case now reported in New South Wales occurred in close association with contagious abortion in cattle, and the agglutination results point to a *Brucella abortus* infection.

References.

⁽¹⁾ W. J. Penfold and H. M. Butler: "Undulant Fever in Australia," THE MEDICAL JOURNAL OF AUSTRALIA, May 31, 1930, page 702.

⁽²⁾ T. Storie Dixon: Letter to the Editor on "Undulant Fever in Australia," THE MEDICAL JOURNAL OF AUSTRALIA, June 14, 1930, page 797.

⁽³⁾ T. Storie Dixon: "A Case of Malta (Undulant) Fever," THE AUSTRALASIAN MEDICAL GAZETTE, January 20, 1908, page 23.

Reviews.

MALIGNANT DISEASE OF THE LUNG.

"CANCER OF THE LUNG AND OTHER INTRATHORACIC TUMOURS,"¹ by Maurice Davidson, Dean of the Broughton Hospital Medical School, is a short excellently illustrated work of only one hundred and seventy pages. The book is divided into seven chapters dealing with the following aspects in the following order, namely: Statistics, pathology, clinical signs, symptoms, radiology, diagnosis, benign tumours and treatment.

The first chapter, that on statistics, clearly sets out the fact that the incidence of lung cancer is enormously increasing. Statistics disprove the theory that inspiration of war gases *et cetera* may have been the cause of this increase, but rather support the contention that true influenza is a common antecedent to cancer of the lung.

The modern pathological views especially on cell differentiation are outlined carefully and this chapter makes interesting reading. The author sets out the necessity for detailed clinical examination as the careful tabulation of clinical facts aided by repeated radiological examinations seems to be absolutely necessary before early diagnosis can be made.

The final chapter on treatment is absolutely modern and up to date and the author advocates many forms of treatment including the use of radium and surgical measures. Many good results have already been obtained by these radical means and they certainly appear justifiable as the only alternative seems to be to let the patient die. Similarly

as an aid to diagnosis the author recommends amongst other well accepted measures the use of the thoracoscope and bronchoscope.

There are fifty excellent illustrations, mainly radiograms, and these alone convey to the reader interesting information. This book should be purchased by all pathologists, radiologists and clinicians interested in chest work.

Analytical Department.

"VI-LACTOGEN."

"VI-LACTOGEN" is claimed by the manufacturers, Nestlé and Anglo-Swiss Condensed Milk Company (Australasia), Limited, to be prepared from pure cow's milk and to produce, when diluted, an infant's food closely approximating the composition of human milk. It is said to differ from "Lactogen" in containing less protein and more carbohydrate. A full report on the preparation of "Lactogen" will be found in THE MEDICAL JOURNAL OF AUSTRALIA of January 3, 1925. "Vi-Lactogen" is further claimed to give a "completely modified" milk, containing growth-promoting vitamins, on simple dilution with water. The additional fat required is provided by the addition of butter fat. It is rightly claimed that cow's milk fat is as rich in vitamins A and D as human milk.

Two samples of "Vi-Lactogen" were submitted to our analyst: "A," supplied by the manufacturers, and "B," bought in the open market. The results of the analysis are set out in the accompanying table:

Constituent.	Sample "A."	Sample "B."	Manufact- urer's Analysis.
Fat percentage	23.8	24.4	24.2
Protein percentage .. .	15.5	14.9	14.0
Lactose percentage .. .	55.6	55.85	56.9
Ash percentage	3.1	2.95	3.0

In the analysis of the fat the Roesse-Gottlieb process was used.

It should be noted that "Vi-Lactogen" is a white, finely granular powder, which on dilution with hot water gives a liquid of the colour and consistency of milk. On dilution, one in eight, the following percentages were obtained:

Fat	3.0
Protein	1.9
Lactose	6.9
Ash	0.4

The dilution recommended by the manufacturers should therefore give a composition which approximates closely to that of the average sample of human milk.

It must be concluded that the claims of the manufacturers are justified and that "Vi-Lactogen" may be recommended when it is necessary to find a substitute for human milk.

¹ "Cancer of the Lung and Other Intrathoracic Tumours," by Maurice Davidson, M.A., M.D., B.Ch., F.R.C.P., with a foreword by Arthur J. Hall, M.A., M.D., D.Sc., F.R.C.P.; 1930. Bristol: John Wright and Sons Limited. Crown 4to., pp. 184, with illustrations. Price: 17s. 6d. net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 7, 1931.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

TONSILLECTOMY.

CORRESPONDENCE in the pages of a medical journal on matters dealing with the theoretical or practical sides of medical practice is valuable to those taking part if they approach the subject with a genuine desire to reveal the truth and not with the idea of proclaiming their prowess, if their minds are receptive and not so occupied by their own success that the value of another person's contribution is excluded. The general body of readers can as a rule sift the grain from the chaff; self glory and vain boasting, purblindness and ignorance, personal dislike and mistrust are difficult of concealment. It may thus be stated that the correspondence columns of the journal are by no means the least important part of it.

Some months ago an interesting discussion took place in the columns of this journal on the application of the various methods for the removal of tonsils. Enucleation by dissection, the method of Sluder and diathermy were in turn advocated by different writers. No definite conclusions of a general nature emerged from the discussion and since a request has been received for a statement in these columns, it is thought advisable to reopen

the question. In the first place it is possible to make certain definite statements in regard to the three types of operation. Sluder's operation, though easy of completion, always results in incomplete removal of the tonsil. The lower pole remains. In many patients, particularly young children, tonsillectomy (it should really be called partial tonsillectomy) by this means appears to be satisfactory. When this happens, either there was no gross infection of the tonsil before operation, or the remaining lower pole, if infected, has remained undiscovered. Enucleation of the tonsil by dissection is to all intents and purposes the ideal method in that it results in the immediate removal of all the tonsillar tissue. The disadvantage most often mentioned is hæmorrhage, either of a secondary or recurring nature. With diathermy the tonsil is gradually destroyed by desiccation and the process is a lengthy one, extending often over several weeks. It is important to remember that in assessing the value of different procedures comparisons must be made only of the results of experts. It would be obviously wrong to compare the results of a surgeon adept at enucleation by dissection with those of another surgeon who was but newly acquainted with the technique of diathermy. Comparisons should be made only when all the attendant circumstances (type of anaesthesia, assistance and so forth) are strictly comparable. Some men compare their results obtained by a well tried and perfected technique with those obtained by their prentice hands with another. Further, when immediate results of admitted masters are compared, sight must not be lost of remote results. These are more difficult to ascertain. A. D. Kaiser has recently shown in a study of upwards of four thousand children, observed over periods up to ten years, that the real value of the removal of tonsils and adenoids cannot be definitely established in a few years and that apparent benefits during the first few post-operative years are not so evident over a ten year period. He showed that removal of tonsils has a beneficial effect in regard to the incidence of sort throat and susceptibility to scarlet fever and diphtheria. What is more important to the present discussion, is that he found that incom-

plete tonsillectomy does not offer the same protection against the usual throat complaints and infections as complete tonsillectomy.

Several conclusions may be drawn. In the first place Sluder's operation, if used at all, should be reserved for tonsils not grossly infected. It should be used with the full knowledge that it results in incomplete removal of the tonsil and that a second operation may be necessary. It should be pointed out in this connexion that Fowler in his recent and extremely valuable book on tonsil surgery has admitted that even after complete removal recurrence may take place in 1% or 2% of cases. In the second place enucleation is probably the most suitable operation for quite a large number of candidates for tonsillectomy. That the process is completed at one sitting and that a dissection carried out under clear vision leaves no doubt as to complete removal, are strongly in its favour. If a general anæsthetic is to be given, the associated risk must be considered. Diathermy has, as its protagonists point out, the advantage of allowing patients to continue with their daily work. Surgeons who use enucleation in their practices and advocate it strongly, have been known to have their own tonsillar tissue destroyed by diathermy. If they made their choice from a desire not to break the continuity of their work, well and good; if they sought diathermy because of risk of post-operative complications, it is time they gave up enucleation by dissection. They should not expose patients to risks they themselves are not prepared to take. The disadvantages of diathermy are two—that the treatment is protracted and that certain patients tire of it before desiccation of all tonsillar tissue is complete. In stating these conclusions we wish to emphasize again that they are stated on the supposition that the operations in question are performed by experts. Though complications are always liable to occur, they are less liable to occur in the hands of experts. If one operation is more fool-proof than another, and if fools must perform operations, they should restrict their activities to the sphere best suited to them. Difficulty in technique should be no bar to its mastery. The condition of certain patients will sometimes call for a certain

type of procedure. If the surgeon be not expert with the requisite method, he should hand the patient over to someone who is. The patient must here, as always, be the first consideration.

Current Comment.

CARDIAC RUPTURE.

"SHE died of a broken heart" is a statement conveying about as much information as the remark: "She died of a Tuesday." But the writer of paper-backed fiction has some basis for his doleful expression, for cardiac rupture does occur. It is, however, a cause of death in old age and is not, as the novelist would have his readers believe, likely to terminate the existence of the recently impoverished young heroine whose lover has so far neglected his obligations as to wed the unlovely daughter of the wealthy jam manufacturer. Cardiac rupture has been recognized for many generations. There has been much speculation concerning its possible causation; chief among the suggested causes are fatty degeneration and aneurysm of the heart wall. It is generally conceded that rupture probably never occurs in hearts which have not already been weakened by some preexisting disease such as fatty degeneration of the myocardium or narrowing of the lumina of the coronary arteries. The tear is usually in the anterior wall of the left ventricle, near the septum; it is ragged as a rule and of various size, and runs in the direction of the muscle fibres. A remarkable feature is the variation in the quantity of blood which escapes into the pericardium; it may be one hundred cubic centimetres or so (a few fluid ounces) only or more than 1.28 litres (one quart). E. H. Beresford and C. J. C. Earl have reviewed a series of forty-six cases of cardiac rupture and report their conclusions in a recent paper of great interest.¹ Since the year 1903 there have been forty-six deaths due to cardiac rupture in the Tooting Bec Hospital, which is an institution devoted largely to the care of old people afflicted with some mental disorder. In this series four-fifths of the patients were women; former observers have stated that men are more commonly affected. Twenty-five of the forty-six deaths occurred during the eighth decade and thirteen during the ninth decade.

Reports appear to indicate that cardiac rupture occurs most frequently among the insane; Krumbhaar suggests that this high incidence is due to the common factor—arterial disease. But Beresford and Earl offer another explanation, namely, that there is a more careful inquiry into the deaths of insane patients, and in mental hospitals *post mortem* examinations are performed far more frequently than in ordinary hospital practice.

¹ *The Quarterly Journal of Medicine*, October, 1930.

Thus, among the general population many of the deaths certified as due to syncope *et cetera* may be due actually to cardiac rupture. Probably both explanations together provide the correct answer. The association of syphilitic and other arterial disease with insanity is, of course, common, and degeneration of the myocardium, the result of disease of the coronary arteries, must be accepted as a predisposing cause of cardiac rupture. Beresford and Earl suggest also the possibility that the excessive fat in the wall of the heart is due to some metabolic disturbance which may be concerned in the causation of the senile psychoses. A comparison of the *post mortem* records of the incidence of cardiac rupture among old people in general and mental hospitals would be of interest.

In every one of fourteen ruptured hearts examined by Beresford and Earl there was evidence of recent infarction. In one the rupture had occurred through an area of necrosis in the wall of an aneurysm of the heart. They conclude, therefore, that recent infarction is the preeminent cause of cardiac rupture, though they admit that aneurysmal dilatations may sometimes rupture. It may be added that cardiac aneurysm is very often the result of old infarction.

The site of rupture is nearly always within the area supplied by the anterior descending branch of the left coronary artery, the vessel which is most liable to obstruction. Beresford and Earl point out that the point of rupture through the visceral pericardium does not always coincide with the rupture of the heart wall. The blood sometimes tracks along between visceral pericardium and heart muscle; a hematoma sometimes forms, bulging the visceral pericardium outwards. This fact in itself is sufficient indication that death from cardiac rupture is not necessarily immediate.

Partial rupture, that is, a rupture of the outer parts of the heart wall only, has been described; Beresford and Earl observed the condition twice in their series. In each instance there was in the pericardial sac a considerable quantity of blood which no doubt came from the capillaries. This gives rise to speculation as to whence comes most of the blood when rupture is complete. At first glance it would appear that practically all the blood in the pericardium must come from within the ventricle, but the track of the rupture is often tortuous and there is little or no evidence that the pent-up blood bursts through the ventricular wall in a manner comparable to the bursting of flood waters through an inefficient dam. Beresford and Earl believe that hæmorrhage from the engorged capillaries at the periphery of an infarct may not only be a result of rupture, but a factor of great importance in its causation. They stress the importance of cardiac adiposity which is usually excessive. It is well known that after infarction fat may become almost liquid in consistency. When it is further infiltrated with blood it can be expected to offer but little resistance to any strain imposed upon

it. In the opinion of Beresford and Earl muscular action is not the main factor in the mechanism of rupture, but they point out that the internal tear is usually situated either at the base of a papillary muscle or at the junction of the septum and the outer wall; the tissues in either of these situations are subject to the stress of two conflicting muscular forces. If muscular action were a factor of great importance, rupture would be more likely to occur in heavily muscled hearts instead of in hearts with flabby, degenerated muscle. Furthermore, in the experience of Beresford and Earl, when infarction does occur in well muscled hearts, it is much less likely to be followed by rupture.

It may be remarked that these investigations have resulted in the addition of little or nothing of value to medical knowledge, for does it matter what is actually the ultimate cause of the inevitable death of an aged sufferer from cardiac disease? Is it important to know whether his heart ruptures or merely ceases to beat? Perhaps, as far as the individual is concerned, it matters nothing. What does matter is that the work of Davenport, Krumbhaar and Crowell, Beresford and Earl has led to some increase in the knowledge of cardiac pathology. It is not inconceivable that this added knowledge may help in the solution of some of the many complex problems of the heart and its diseases.

An interesting possibility, if Beresford and Earl are correct, is that diagnosis of rupture of the heart may occasionally be made *ante mortem*.

CONGENITAL STENOSIS OF THE DUODENUM.

CONGENITAL stenosis of the duodenum is a rare condition. An instance has been reported by Lennox Gordon.¹ The patient was a coloured boy, aged two years and six months. He was admitted to hospital with a suggested diagnosis of nephritis. Nephritis was suspected on account of oedema of the face, hands and legs. No definite clinical history was obtained until after the patient died. The patient did not vomit and the abdomen was not distended. After an attack suggestive of acute intestinal obstruction the abdomen was opened, but operation had to be abandoned on account of the patient's condition. At *post mortem* examination stenosis of the duodenum was the only pathological lesion discovered. The constriction was found in the second part of the duodenum in the neighbourhood of the papilla of Vater. This is one of the usual sites of the lesion; the other is at the duodeno-jejunal junction. The remarkable features of the case are the age of the child and the absence of abdominal distension or obstruction while the patient was in hospital. The important point to be remembered is that this lesion does occur and that operation will save life if a correct diagnosis is made.

¹ *The British Journal of Surgery*, October, 1930.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

The Capillary Blood Pressure in the Human Skin.

THE adaptation of the method of capillary puncture for the determination of the pressure in this portion of the vascular bed in human subjects is described in some detail by E. M. Landis (*Heart*, Volume XV, Number 2). Observation on the capillary loops in the skin at the base of the finger nails indicate that the pressure in these vessels is considerable. The average pressure of blood in the arterial side of the capillary loop is 32 millimetres of mercury, at the end of the loop 20 millimetres and in the venous limb 12 millimetres. There is no doubt that the capillary bed contributes largely to the peripheral resistance. The average pressure in the arterial limb of the capillaries is above the osmotic pressure of the plasma proteins, while this osmotic pressure is greater than the blood pressure in the venous limb. When the hand is above the level of the heart the pressure in the capillaries is almost independent of the absolute level, but as the hand is lowered there is an increase in capillary pressure corresponding to the increased hydrostatic pressure acting on the blood in the capillaries. Venous congestion produced by means of a cuff increases capillary pressure until it exceeds the cuff pressure by eight to fourteen millimetres. Hyperæmia due to heat and the flare due to the local effect of histamine produce considerable rises in pressure in both the arterial and venous capillary loops. In heat hyperæmia the pressures may be 60 millimetres and 45 millimetres of mercury respectively. Local cooling of the skin produces an initial fall in capillary pressure followed in about five minutes by a secondary rise to as much as 14 millimetres above the original level. Wheal formation due to freezing is accompanied by increase in pressure in the arterial limb to 49 millimetres and in the venous limb to 32 millimetres. It would appear that the arterioles are responsible for about 70% of the total fall in blood pressure in the peripheral circulation, while the remaining 30% occurs in the capillaries.

The Reactions of the Vessels of the Human Skin to Cold.

If any of the bodily extremities be immersed in an ice-water mixture, after a period of several minutes the cooled part becomes congested and bright red in colour. This reaction has been recognized for many years. Thomas Lewis (*Heart*, Volume XV, Number 2) has now investigated the effect in greater detail. If the surface temperature of the cooled part is observed, it is found that after a preliminary steep fall almost to the level of the cold bath the temperature rises

once more. This occurs some twenty or thirty minutes after immersion. The temperature is sustained for several minutes and then falls once more. This sequence of rise and fall is continued, but gradually becomes less in amplitude and if the immersion is continued for a sufficient time the "hunting" effect finally disappears. On removal of the cooled part from the bath its temperature rises steeply to a level considerably (10°C.) above that of a control part. This after-rise of temperature may be sustained for many hours. Usually in the fingers the rise occurs in fifteen to twenty minutes after cessation of the cooling and declines to the level of the control within an hour. The reaction is only seen if the previous environmental temperature is above about 17°C. The most favourable conditions for observing the effect in the fingers are such that the initial surface temperature is between 25° and 28°C. Immersion in baths at temperatures below 15°C. produces the effect described, but it is diminished in intensity at the higher temperatures. The reaction occurs after degeneration of the sympathetic nerves supplying the skin and also after division of the corresponding sensory nerves. After the sensory nerves have degenerated these vascular effects cannot be produced. This suggests that an axone reflex is an essential part of the mechanism. From the available evidence it would seem that exposure to cold leads to the formation of H-substance and that this stimulates the sensory nerve endings and so causes vascular dilatation through a local axone reflex. The "hunting" of surface temperature can then be ascribed to accumulation of H-substance which is then washed away by the increased blood flow accompanying the vasodilatation. The mechanism described must come into frequent use during cold weather and probably plays an important part in protecting exposed parts against excessive cooling. It is suggested that loss of the axone reflex control of the local blood supply may be responsible for the production of trophic lesions following degeneration of sensory nerves.

The Permeability of the Placenta for Glucose.

SINCE Zuntz first showed that the intravenous injection of sugar in the mother was rapidly followed by an increased sugar content of the foetal blood there has existed a controversy as to whether the placenta exerts any secretory function or whether the exchanges between the foetal and maternal bloods take place merely by diffusion. Hans Schlossmann (*Zeitschrift für die gesamte experimentelle Medizin*, July, 1930) criticizes the researches which have suggested the existence of an active secretory function in the placenta, on the grounds that in all of them the blood flow through the intervillous spaces was more or less interrupted. By immersing dogs in warm baths of saline solution and opening the uterus and

foetal membranes under the saline solution the author has succeeded in making a series of simultaneous estimations of the foetal and maternal blood sugar content, while the foetus remained in good condition and no separation of the placenta occurred. After intravenous injection of glucose in the mother the blood sugar content in the umbilical vein was higher than that in the umbilical artery, while the reverse relationship held in the afferent and efferent vessels of the uterus. After thirty-five minutes at most the sugar contents of the maternal and foetal blood were equal. Then the quantity of sugar in the maternal blood fell more rapidly than that in the foetal blood and as a result sugar passed from the foetus to the maternal circulation. This reversal in the direction of sugar transport was indicated by the reversal in the relationship of the blood sugar in the umbilical artery and vein and in the corresponding uterine vessels. From these findings the author concludes that an active secretion of glucose through the placenta is unlikely. The rapidity of the increase of the foetal blood sugar suggests, while it does not prove, that the transfer is by diffusion, but it is highly improbable that a secretory process would proceed with equal facility in either direction.

Regulation of Gastric Acidity.

F. L. APPERLY AND JOAN H. NORRIS (*Journal of Physiology*, September, 1930) have carried out a series of analyses of the stomach contents after the introduction of a known amount of dilute hydrochloric acid into the stomach. An indifferent substance, such as glucose, was introduced with the acid. By following the curves of acidity and dilution of the indifferent material it was possible to determine whether the changes in acidity were entirely due to dilution with a neutral fluid which may have been secreted by the gastric mucosa, or whether neutralization by an alkaline fluid had also occurred. In the majority of normal cases the curve of acidity fell more rapidly than that of dilution, indicating that active neutralization had occurred. In a number of cases the acidity and dilution curves coincided, showing that the fall in acidity was due entirely to dilution with a neutral fluid of either gastric or duodenal origin. A third group showed a more rapid fall of the dilution curve than of the acidity curve, indicating that, in spite of the presence of artificially introduced acid, the gastric mucosa was still secreting an acid juice. This is opposed to Pavlov's dictum that the presence in the stomach of any considerable quantity of acid prevents the further secretion of gastric juice. The authors conclude that MacLean's conclusion that the fall in gastric acidity is due to the secretion of a neutral chloride solution by the gastric mucosa does not represent the whole truth and that there occurs in addition to this mechanism a regurgitation of duodenal fluid which may be either alkaline or neutral in reaction.

BIOLOGICAL CHEMISTRY.

Vitamin B and Carbohydrate Metabolism.

SAMUEL LEPOVSKY, CLARENCE WOOD AND HERBERT M. EVANS (*Journal of Biological Chemistry*, June, 1930) have reinvestigated the relation of vitamin B to carbohydrate metabolism. The glucose tolerance test was used because of its sensitivity to disturbance in carbohydrate metabolism. Rats were used throughout the experiments and these workers used the same animal for all the points on the glucose tolerance curve. The animals used were definitely avitaminotic. Full details are given in the original paper. The data obtained leave little doubt that the avitaminotic animal shows some disturbance in its carbohydrate metabolism as indicated by glucose tolerance curves, but animals can suffer for a long period from vitamin B deficiency without an appreciable lowering of the glucose tolerance. Whether this disturbance in metabolism is primary or secondary in nature has not been decided. In definite beri beri which is the extreme form of vitamin B disturbance, the animals showed little or no tolerance for glucose, the blood sugar rising steeply without showing any tendency to go down after two hours. As the avitaminosis decreases, the glucose tolerance increases, until a stage in avitaminosis can be reached which does not interfere markedly with glucose tolerance.

Blood Cholesterol Content.

DURING the course of some experiments needing the repeated administration of chloroform to rabbits, an increase in fat in the Kupffer cells and capillaries of the liver was noted by Samuel H. Gray (*Journal of Biological Chemistry*, July, 1930). A quantitative examination of the blood cholesterol showed it to be greatly increased. With this finding in view a series of experiments was undertaken to determine the constancy and period of appearance of the hypercholesterolemia. As a control to the chloroform and also as a parallel study in the possible general relationship between narcosis and hypercholesterolemia, paraldehyde and urethane were also administered. The chloroform was given either by injection or by inhalation. Paraldehyde and urethane were given by the stomach tube. Full details of the dosage and the method for determining the blood cholesterol content are given in the paper. Mention is made of the wide variation which occurs in the blood cholesterol content of normal rabbits and that only pronounced changes can be considered of any value. From the results obtained by these experiments there appeared to be a definite rise in the amount of blood cholesterol, beginning about three weeks after the repeated administration of chloroform. If this administration is continued for a

longer period the cholesterol level remains high, but does not progressively increase. After the repeated administration of urethane or paraldehyde no very pronounced change in the amount of blood cholesterol was found to occur, though the possibility of a slight increase after repeated administration of urethane is not finally settled. No statement is made as to the significance of the increase in blood cholesterol in these experiments, but further investigations are being carried out.

The Effect of Meat Diet on the Kidney Function.

WALTER S. MCCLELLAN AND EUGENE F. DU BOIS (*Journal of Biological Chemistry*, July, 1930) have investigated the effect of a prolonged meat diet on the clinical condition, urinary constituents, kidneys and fat metabolism of two men who lived on an exclusive meat diet for one year, and on a third man who had meat only for ten days. The meats eaten were varied in character and the relative amounts of lean and fat meats ingested were left to the instinctive choice of the individual. The daily intake of liquids, coffee, black tea, meat broths and water varied from one to two litres. The protein content of the diet varied from 100 to 140 grammes, the fat from 200 to 300 grammes, the carbohydrate, derived entirely from the meat, from seven to twelve grammes and the fuel value from 2,000 to 3,100 calories. At the end of the observation both men were in good clinical condition without any loss of mental or physical vigour. Bowel elimination was only disturbed in one instance, when the proportion of protein calories exceeded 40% and a diarrhoea developed. Fat aided in the regulation of the bowels. There was no clinical evidence of any vitamin deficiency throughout the test. During the first week the men lost weight due to a shift in the water content of the body while adjusting itself to the low carbohydrate diet. Afterwards their weights remained constant and no evidence was obtained that the prolonged meat diet was detrimental to nutrition. In the two subjects who remained on the diet for a year the blood pressure of one remained constant, the systolic pressure of the other decreased by 20 millimetres of mercury and the diastolic pressure remained uniform. The daily determinations on the urine included volume, acidity, specific gravity, total nitrogen, total acetone bodies, albumin and glucose. The acidity of the urine during the meat diet régime was increased twofold to threefold as compared with the acidity when a mixed diet was being taken. Acetonuria was present throughout this period. While taking the diet the men metabolized food-stuffs with fatty acid-glucose ratios between 1.9 and 3.0 and excreted from 0.4 to 7.2 grammes of acetone bodies per day. The clinical tests carried out revealed no evidence of damage to the kidneys or damage to kidney func-

tion. The urine never contained any albumin or casts and the nitrogenous constituents of the blood remained normal. These results show that ill effects do not occur from the prolonged use of exclusive meat diets by normal subjects.

The Effect of a Meat Diet on the Metabolism of Calcium and Phosphorus.

WALTER S. MCCLELLAN, VIRGIL R. RUPP AND VINCENT TOSCANI (*Journal of Biological Chemistry*, July, 1930) undertook the analysis of the diet of two subjects who for the period of one year lived exclusively on meat. The food taken by the subjects was duplicated as far as possible and analysed for nitrogen, fat, calcium and phosphorus and the results presented in detail. These results agree in general with the findings available from other workers. The observations made included some to determine the efficiency of absorption from the intestinal tract. In the case of one subject, K.A., the nitrogen loss in the faeces varied from 2.4% to 7.1% with an average of 4.5% while the exclusive meat diet was being taken, a lower figure than that obtained with the subject taking a mixed diet. The other subject, V.S., lost from 6.5% to 10.4% of the ingested nitrogen with an average of 7.5% while taking the meat diet and there was no significant difference during the control period. The fat lost by K.A. averaged 3.0%, the loss by V.S. averaged 9.2%. In both subjects the absorption of fat was the same as during the control period and in both the results were within normal limits and the nitrogen and fat well absorbed. With regard to the nitrogen balance, one subject, K.A., remained in nitrogen equilibrium while taking the meat diet, with an average daily intake of 19.9 grammes, and the other lost a little more than his daily intake of 18.7 grammes. Both men definitely lost more calcium than they ingested throughout the period of meat ingestion, and it was also noted that both the calcium excreted in the urine and the total output were greater than the amounts excreted when the subjects were receiving a mixed diet. This, in the light of previous investigations, may have been due to the acid nature of the diet. There was no evidence that this loss of calcium from the body was in any way injurious and no rarefaction of the bones could be shown by roentgenograms. The only calcium intake which was not accurately controlled was the calcium content of the drinking water, table salt and the small particles of bone taken with bone marrow. In spite of the high phosphorous content of the meat diet, K.A. ingested only 2.34 grammes more than he excreted over the entire period of meat ingestion, while V.S. excreted a quantity 5.34 grammes greater than his intake. Throughout the period of observation the blood calcium and phosphorous content remained normal.

Special Articles on Diagnosis.

(Contributed by Request.)

XXXI.

THE CAUSES OF OBESITY.

OLIVER WENDELL HOLMES, in the course of some amusing and sarcastic remarks on phrenology, tells how Professor Brainerd, during a *séance* in his "scientific Golgotha," would dictate "Alimentiveness 8" to his pupil and add the illuminating comment: "Don't you see that he has burst off his lowest waistcoat button with feeding, hey?" The physician of today cannot always be so sure. He may frequently doubt whether the meals of the fat patient are quite so self-denying an ordinance as the patient himself declares, but even an imperfect comprehension of the endocrines has made him less confident than the phrenologist that exogenous obesity is always easy to recognize.

Among the obese we see the exogenous type, who has sacrificed his figure to his appetite and desire for repose, and the endogenous type who owes his bulk to some insufficiency in the internal secretions. This distinction is simple, but not always easily observed, as several factors are frequently concerned.

The diagnosis of obesity itself is obvious as a rule, though it may be helpful at times to refer to tables or appeal to the simple formula of Broca (normal weight in kilograms = height in centimetres - 100), making due allowance for age. But it should be emphasized that obesity, as a factor concerned in other pathological processes, such as diabetes and cardiovascular disease, should be taken into consideration.

Now, from the practical point of view, the physician is confronted with a patient like Shakespeare's fifth age of man. How may he recognize the causes of this undue laying-on of fat? Is it possible to determine such causes by simple means?

Points for Consideration in the Diagnosis of the Cause of Obesity.

Let us consider in order the points helpful in arriving at a tolerably correct diagnosis.

Age.

The younger the patient the more likely is the cause to be found in the ductless glands or in some innate hereditary factor. The gonads, the thyroid gland and the pituitary gland may all be involved in causing obesity in a young patient, and are dealt with later. The influence of increasing years in diminishing the energy output must also be remembered.

Heredit.

This may be of importance whatever the age of the patient. It is considered that in over 60% of cases a history of heredity may be obtained. This significant factor does not of necessity involve an endocrine defect, but may be due to some inherent cellular capacity to use carbohydrates more aptly for storage and to derive less energy from fats. It should be noted that in certain races and even in certain families there may be a characteristic distribution of fat. Fat is readily laid down in the face, on the thighs and hips and the omentum and mesentery, in many individuals who show no sign of any endocrine defect. This individual tendency of distribution is worth remembering.

Occupation and Social Circumstances.

The factors of occupation and social circumstances are so obvious that they may be overlooked, particularly by the crank in endocrinology. The degree of financial success attained by an individual, his temperament, the exercise he takes and especially the type and amount of food available for him, bear a decided ratio to his waist measurement. This applies with special force to those

past the fourth decade of life. Also remember that the time of day when the largest meals are taken is important. This is frequently the end of the day, when night lies ahead with little opportunity for spending and much for storing.

Sex.

It has been suggested that the lower percentage of hæmoglobin in the blood may account for the more ready occurrence of obesity in women than in men, because of lessened oxidation. This may be so, though there is little direct evidence of lowered oxidation in the obese in general. But the influence of puberty, pregnancy and the climacteric none can deny. The early adiposity of some budding girls (who, not seldom, have large and probably hard worked thyroids), the growing bulk of the young barren married woman, the maturer charms of the young matron, and the "middle-aged spread" of the less young matron at the menopause are all well recognized, and are largely due to glandular disturbance or imbalance, chiefly ovarian and thyroid.

History of Illness or Operation.

An extreme and intractable type of obesity may be seen occasionally after epidemic encephalitis. Apart from this, less degrees of corpulency are seen in individuals, chiefly young people, whose bodies have been jolted from the smooth paths of normal growth and progress by some more or less severe illness. The permanency of such change will of course depend on the underlying cause, which is not infrequently exogenous, for during convalescence well meaning friends and relatives often put the patient's carbohydrate tolerance to an exacting test.

Anæmia.

Anæmia is often worth thinking of; the recognition of and improvement of a faulty blood state may sometimes lead to the carrying out of more effective oxidation in the body. A reference to the once common chlorosis illustrates this point.

Cardiovascular Disease.

In obesity arterial hypertension and myocardial weakness are common, affording an excellent example of a vicious circle. Though the fat man under thirty may be as efficient as the lean, as age increases his exercise tolerance lessens and eventually some degree of circulatory embarrassment is inevitable. Conversely the frankly "cardiac" patient often carries too much fat. He katabolizes less efficiently and is capable of less and less physical effort—conditions not tending to lighten the fleshly burden under which he labours.

Distribution of Fat.

Familial tendencies have been mentioned.

Hypophyseal dysfunction tends to produce deposition of fat about the epigastrium and lower abdomen and round the thighs, to a less extent on the sides of the chest and over the deltoids. In adults the limbs are often unaffected. Contrasted with this the fat is more evenly placed in thyroid defects, though special deposits may be looked for on the backs of the hands and in the clavicular regions.

Gonad deficiency tends to cause fat deposits in the breasts, the lower abdomen and the upper thighs, the so-called "trochanteric padding."

Here may be mentioned the nodular types or lipomatoses, such as *adiposis dolorosa*, in which there are pads of fat about the trunk and arms, less often the legs. This unusual condition, due probably to a pituitary defect, is recognized by the association of localized pain and tenderness with the obesity and the coexistence of asthenia and psychic disturbances.

Tests.

Consideration of these factors in a given case should help us to determine whether the principal causes are exogenous or endogenous. How much further may a differentiation go? Are there any tests that may help? There are two which can be of service.

Estimation of the Basal Metabolic Rate.

In general it may be stated that in a simple exogenous obesity due to excessive intake and deficient energy output, the rate is normal, whereas the rate is usually definitely low in cases of endocrine defect. Minor variations in the rate as calculated should be disregarded, since there is a fairly large error involved in estimating the surface area of corpulent individuals, and as this enters into the calculations no result should be regarded as giving satisfactory evidence of a pathologically lowered metabolism unless the figure reads -20% or less. This test confirms our clinical judgement and gives us a definite standard of the degree of dysfunction, though it is seldom really necessary for establishing the diagnosis.

A rough estimate of the basal metabolic rate may be made by some simplified form of Read's formula, as:

Basal metabolic rate = 0.68 (pulse rate + $0.9 \times$ pulse pressure) - 70 .

In my experience this formula is more useful in hyperthyroid states than in those such as the hypothyroid. Careful observations of the temperature may also be found of value.

Estimation of Carbohydrate Tolerance.

The estimation of the tolerance for carbohydrates may also be useful as a confirmatory test. Increase of the tolerance is observed in the pituitary forms of obesity; a decrease is, of course, familiar in defects of pancreatic internal secretion, for example, *diabetes mellitus*.

The Endocrine Deficiencies.

Now let us consider the various endocrine deficiencies with regard to their recognition.

Thyroid Hypofunction.

Many instances of hypothyroidism are still missed, for, although the condition of actual myxedema is distinctive, the lesser grades of thyroid defect may escape the unmindful clinician. The classical picture is the patient with dry infiltrated skin, expressionless face, tolerance of warmth and intolerance of cold, heavy personality, thick immovable voice with its "leathery" articulation, sparsity of hair, particularly well observed on the outer eyebrows. The fat distribution has been pointed out before, but it must be admitted that the person affected with hypothyroidism is not necessarily fat at all, though he usually is. But apart from so characteristic a clinical state, there are many degrees of subnormal thyroid function recognizable by the presence of some only of the features seen in the full syndrome. The lowering of the basal metabolic rate below normal is proportional to the degree of lack in the gland function.

Pituitary Hypofunction.

Hypopituitarism may be due to many causes and can give rise to a number of various syndromes, owing to the multiple functions of the gland and its extraordinary anatomical position. The most characteristic changes that are associated with pituitary obesity are some or all of the following: Lowered sexual function; smooth, dry, hairless skin; lowered basal metabolic rate; mental dulness and general reversion to the infantile type. Pituitary defect may be looked for in the following circumstances: (i) Obesity following a history suggesting encephalitis; (ii) obesity arising before puberty, with stunting of physical and mental growth and genital hypoplasia; (iii) obesity associated with the above features in the adult, including obesity as a result of tumour in the sellar region. In this last event the local and general symptoms of pressure on the brain and surrounding structures should be looked for, especially by radiological examination and charting of the visual fields.

Gonad Deficiency.

Evidence of the presence of a natural or artificial climacteric or the recession of the sex characters will put us on the track here. The fat distribution, especially

in women, is somewhat characteristic. As a rule the sex glands do not show defects *per se* before the age of thirty-five years, except in association with lack of other internal secretions. This brings us to a very important point. Single gland defects are probably not common, especially in connexion with the study of obesity. The relations between the three glands here dealt with are so intimate that a failure of one draws in others to share the *déboîte*.

Conclusion.

In conclusion, the observant physician will not confine his recognition and treatment of obesity to those patients actually complaining of overweight. He will be quick to see the importance of undue adiposity in such widely differing states as cardiovascular disease, chronic bronchitis and emphysema, diabetes, osteoarthritis of hips and knees and chronic constipation. By a judicious process of elimination he will probably arrive at the most likely causes of the obesity, and will be ready to admit the probable importance of several factors. Thus the diagnosis of a subthyroid state will not blind him to the existence of an additional exogenous factor involving diet and exercise, nor will the occurrence of an artificial menopause in a young woman of ease prevent him from giving due consideration to the needs of an idle and probably overfed body. Finally, he will not forget that very important aetiological factor in obesity, the extreme unreliability of the patient as regards diet.

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British Medical Association News.**SCIENTIFIC.**

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Women's Hospital, Crown Street, Sydney, on October 12, 1930. The meeting took the form of a series of clinical demonstrations by members of the honorary staff.

Acute Toxæmia.

DR. E. LUDOWICI showed some pathological specimens which had been removed from the body of a woman aged twenty-three years who had died a few hours after admission on October 6, 1930. The patient, who was a *primipara*, had been pregnant for about eight and a half months. She had noticed a puffiness of the eyelids for a period of six days, but had only become acutely ill on the day of admission. She suffered from violent headache, vomiting and abdominal pain. She was pale and restless. Her face was slightly swollen, but there was no general oedema. The skin was clammy. The pulse was slow. The systolic blood pressure was 210 and the diastolic 140 millimetres of mercury. Sixty cubic centimetres (two fluid ounces) of urine, withdrawn by catheter, contained much blood.

At the *post mortem* examination extensive hæmorrhagic areas were observed in the liver, placenta and brain.

Submucous Fibromyoma and Secondary Anæmia.

DR. LUDOWICI's next patient was a woman aged forty-eight years who had suffered from profuse menorrhagia, but no metrorrhagia, for a period of six months prior to her admission on September 13, 1930. She had suffered also from dysmenorrhœa which commenced one week before the commencement of the menstrual period and continued during the flow. She complained of weakness and breathlessness. Her blood contained 2,830,000 red cells and 6,600 white cells per cubic millimetre. The hæmoglobin percentage was 31 and the colour index 0.6. Some degree of anisocytosis, poikilocytosis and polychromasia was observed. Iron, arsenic and liver extract were administered. On October 1, 1930, her red blood cells numbered 3,610,000 and her white cells 4,800 per cubic millimetre of blood; her hæmoglobin percentage was

estimated at 51 and her colour index 0.7. On October 7, 1930, subtotal hysterectomy was performed.

Dr. Ludowici showed the uterus, which was affected with a submucous fibromyoma.

Bilateral Phlegmasia Alba Dolens and Spinal Deformity.

Dr. A. J. Gibson showed a woman aged forty years who had given birth to seven children at full term and had had normal labours and puerperia. Four years prior to admission, however, she had met with an injury to the lower part of the spinal column and the left side of the pelvis and had been confined to bed for a period of seven months. Two years prior to admission she had been delivered of a dead child; labour on this occasion had been followed by bilateral "white leg," which had necessitated confinement to bed for a period of seven months; for the following five months she had only been able to sit in a chair. At the time of admission she complained that she had suffered from insomnia and persistent pain in the back and side during the existing pregnancy. There was a pronounced lordosis in the lumbar region. Both legs were thickened. The right ankle joint was ankylosed in a position of foot drop; there was restricted movement at the left ankle joint. It was decided to leave her for a trial labour. On October 9, 1930, she delivered an infant weighing 4.27 kilograms (nine and a half pounds), two and a half hours after the commencement of labour.

Friedreich's Ataxia.

Dr. Gibson next showed a woman aged twenty-seven years whose fourth pregnancy had terminated by the delivery of a normal infant on July 28, 1930. The patient had become affected with a weakness of the legs and a clumsy gait at the age of ten years. Walking had become increasingly difficult until at the time of the meeting she was completely bedridden. The speech had become slurred during the two years prior to admission. There was no history of a familial occurrence of the disease nor of consanguinity nor alcoholism.

On September 10, 1930, both Fallopian tubes were removed for the purpose of sterilization. At the time of the meeting there was incoordination of voluntary movements. Her lower limbs were paralysed, but though the movements of her upper limbs were incoordinated she was able to feed herself with difficulty. Her speech was slow and slurring. There was a slight tendency to *pes cavus*. The pupils were equal and active; the knee jerks were absent; the plantar reflexes were extensor in type; the sphincters were normal and the cranial nerves were unaffected. There was no abnormality of sensation; the sense of position with regard to the big toe was lost. The blood did not react to the Wassermann test.

Sepsis Following Abortion.

Dr. H. C. E. DONOVAN showed a woman aged thirty-four years who had had an abortion ten days prior to admission on September 30, 1930. Three days before admission she had become affected by vomiting and diarrhoea and pains in the back and sides. At the time of admission her temperature was raised and her pulse rate was rapid. Her tongue was furred. She was tender in the iliac fossae and over the uterus; there was a condition of brawny hardness round the cervix and a mass in the left fornix and probably also in the right and posterior fornices. Posterior colpotomy was performed ten days after admission. Though no pus was encountered the temperature rapidly fell to normal and the patient felt quite well again.

Another patient shown by Dr. Donovan was twenty-three years of age. She had had an abortion five days prior to her admission to hospital on August 4, 1930. She was delirious and had pyrexia at the time of her admission. The uterus was soft and retroverted and there was tenderness in the left fornix. She was treated by the intravenous administration of a solution of mercurochrome. Within two weeks she appeared to be well and was allowed up, but this was followed by a recurrence of pyrexia. On September 8, 1930, colpotomy was performed; there was a good deal of blood in the parametrium, but no pus was found. Recovery was slow.

Puerperal Sepsis.

Dr. Donovan also showed two patients suffering from puerperal sepsis. One received treatment by local and intravenous administration of mercurochrome and both by the local application within the uterus of charcoal. One of these patients had a severe infection of the perineum; her recovery was slow.

Hyperemesis Gravidarum.

Dr. Donovan's next patient was a woman aged thirty-three years whose last menstrual period prior to her admission to hospital had been from June 27, 1930, to July 3, 1930. She was admitted to hospital on October 2, 1930. Six weeks prior to admission she had lost several clots; morning sickness had continued. The day before admission pains and bleeding had recommenced. At the time of admission it was observed that the placenta was still in the uterus. The urine contained a lot of albumin. The uterus was curetted. On the same evening she collapsed. Glucose solution in saline was administered *per rectum* and pituitrin and strychnine were given subcutaneously. She continued to vomit for a period of forty-eight hours and during the same period voided only 270 cubic centimetres (nine fluid ounces) of urine which contained a large quantity of albumin. The quantity of urine voided gradually increased, while the percentage of albumin diminished. She vomited occasionally until on October 12, 1930, she was again attacked by persistent severe attacks of vomiting. At this time she was very ill and her skin was dry and cold. She improved considerably following the administration of a solution of sodium bicarbonate by the mouth, glucose solution *per rectum* and morphine subcutaneously.

Sapraemia and Aplastic Anæmia.

Dr. Donovan's last patient was a woman aged twenty-three years who had been admitted on August 1, 1930, complaining of lumbar pain following a fall. She was pregnant and had had one previous normal pregnancy and labour. There was a very wide separation of her *recti abdominis* muscles. Labour commenced on September 23, 1930, at 3 p.m. and concluded at 10.45 p.m. on the same day. The short labour was remarkable on account of the lack of efficient abdominal musculature and the fact that the pains never at any time seemed strong. On the second day of the puerperium the temperature and pulse rate rose and the lochia became offensive. On September 30 the red blood cells numbered 1,856,000 and the leucocytes 3,200 per cubic millimetre. The hæmoglobin percentage was 46 and the colour index was 1.2. "Ventriculin" was administered, and on the following day 750 cubic centimetres of blood were transfused. On October 7, 1930, the temperature was 40° C. (104° F.) and there was a large slough on the left arm at the site of the wound made at the blood transfusion operation. The red blood cells then numbered 2,790,000 and the leucocytes 18,600 per cubic millimetre; the hæmoglobin percentage was 55 and the colour index 1.0. Nucleated red blood cells and megakaryocytes were present and the blood picture was that of pernicious anæmia. On October 10, 1930, though the patient still had some pyrexia, she had improved greatly in her general condition.

Lipoid Nephrosis.

Dr. T. DIXON HUGHES showed a primiparous patient aged nineteen years who had been admitted to hospital on July 14, 1930. She had last menstruated from March 24 to March 27, 1930. She had oedema of her feet and face; she suffered from headaches and vertigo. At the time of admission her systolic blood pressure was 132 and her diastolic pressure was 72 millimetres of mercury. The urine contained tubular casts and was solid with albumin. Abortion was induced on July 26, 1930. At several examinations the blood cholesterol content varied from 390 milligrammes to 582 milligrammes per 100 cubic centimetres of blood. The results of renal function tests were normal. At the time of the meeting there were oliguria, gross albuminuria, high blood cholesterol content and extensive oedema. The patient was receiving a full protein diet, thyroid extract and "Novasurol" with ammonium chloride.

Bronchopneumonia and Bilateral Empyema Following Abortion.

DR. R. McD. BOWMAN showed a patient aged thirty-one years, who had aborted as the result of mechanical interference four days before admission on July 31, 1930. Her uterus had been curetted the day before admission. A few hours later she was seized with pain in either side of the chest and was dispatched to hospital. At the time of admission she was pale and dyspnoeic and complained of pain in the chest and across the sternum. Crepitations could be heard over both lungs; the breath sounds were fainter than normal. The uterus was soft.

On August 1, 1930 there was dulness to percussion over the base of each lung. Glycerine was applied to the intra-uterine cavity and she was given oxygen. On August 3 pus was found in the right pleural cavity and the left ankle joint. On August 17 a local anaesthetic was administered and the right pleural cavity was opened and drained. On August 21 pus was found in the left pleural cavity and on August 31 this also was drained of much foul pus. Blood and albumin were present in the urine and the right kidney was enlarged and tender. On September 19 the red blood cells numbered 2,910,000 per cubic millimetre, the hæmoglobin percentage was 54 and the colour index 0.9. There were polychromasia and poikilocytosis.

On October 3, 1930, radiological examination revealed a right-sided interlobar pleurisy, consolidation at the base of the right lung and unresolved bronchopneumonia on both sides.

Post-Graduate Work.

THE MELBOURNE PERMANENT COMMITTEE FOR POST-GRADUATE WORK.

A COURSE of instruction in Melbourne for the Primary Fellowship Examination of the Royal College of Surgeons of England will begin on Monday, April 13, 1931, and will continue until shortly before the examination on August 11, 1931. The lecturers will be: Anatomy, Professor F. Wood Jones; physiology, Dr. C. H. Kellaway.

There will be two tutorial classes a week in each subject. The time-table will be arranged by the lecturers after consultation with the class. The classes in anatomy will be held at the University of Melbourne (by kind permission of the Council of the University) and in physiology at the Walter and Eliza Hall Institute at the Melbourne Hospital. The fee for the complete course will be twenty guineas. Candidates who require dissecting parts must, in addition, pay the usual University fees for these to the Registrar of the University.

Prospective candidates must notify the Secretary of the Melbourne Permanent Committee for Post-Graduate Work, 12, Collins Street, Melbourne, on or before March 14, of their intention to attend this course of instruction and must enclose a cheque for the fee with this notification.

Candidates are reminded that it is necessary to enter for the examination on or before March 31, 1931.

Entrance forms are obtainable from the Secretary of the College of Surgeons of Australasia, 6, Collins Street, Melbourne.

THE SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE, SYDNEY.

THE attention of all medical graduates is drawn to the courses now available at the School of Public Health and Tropical Medicine, University of Sydney.

The Diploma in Tropical Medicine provides a most excellent course for any graduate interested in laboratory work, especially bacteriology and pathology and parasitology. It is particularly suited to the requirements of graduates wishing to practise in Queensland and the

adjacent islands. It includes special courses which may be taken independently of the diploma.

The School has an excellent reference library and suitable clinical material is available.

The Diploma of Tropical Medicine course begins on February 23, that for the Diploma in Public Health, March 9, 1931. This course is so arranged that by giving every week day afternoon, Monday to Friday, throughout the year, the full requirements of the General Medical Council can be met.

The staff of the School is reinforced by a number of visiting lecturers, and every effort is made to provide instruction by first hand investigators of their particular subject.

Full detailed information can be obtained by writing or interviewing the Director.

Obituary.

CHARLES BAGE.

DR. CHARLES BAGE, who died at his residence in South Yarra, Victoria, on December 7, 1930, was a man rich in attainment, worthy of honour and possessed by a love for his fellow men and ability to serve them. He was born at Colac, Victoria, on October 7, 1859, and was the fourth son of the late Edward Bage, civil engineer, who arrived in Melbourne by the steamship *Great Britain* in October, 1853.

Charles Bage attended the Church of England Grammar School, Melbourne, from 1869 to 1876. He was prefect and head of the school in 1876 and played in the football team and represented his school in athletics. In later years he did not forget his school; he was President of the Old Melbournians in 1902 and a member of the Council of the school from 1902 onwards. In 1877, he became a medical student at the University of Melbourne and graduated Bachelor of Medicine and Bachelor of Surgery in 1881. In 1884, he took the higher degree of Doctor of Medicine. He was always interested in the *litteræ humaniores* and in 1887 proceeded to the degree of Master of Arts. On his graduation, he became Resident Medical Officer at the Melbourne Hospital. In 1885 he was appointed Honorary Surgeon to Out-Patients, but in 1887 he changed to the medical side and became Honorary Physician to Out-Patients. Two years later, he was appointed Honorary Physician to In-Patients, but he retired from the service of the hospital in the same year to travel abroad. Soon after the termination of his appointment as Resident Medical Officer, he took up practice at South Yarra. He lived at South Yarra until the time of his death although, from 1922 onwards, he confined most of his practice to the work of a consultant physician in Collins Street. For some time before his death he had retired from actual medical practice.

Throughout the whole of his professional life, Bage took an active interest in the work of the University of Melbourne. From 1886 to 1889 he was one of the examiners in the theory and practice of medicine. From 1905 to 1907 he was Examiner in Therapeutics, Dietetics and Hygiene; from 1911 to 1913 he served for a second term as an examiner in these subjects and in 1923 he was Examiner in *Materia Medica* and Pharmacy. From 1915 to 1917 he was Acting Lecturer in Therapeutics, Dietetics and Hygiene and in 1917, 1918 and 1919 he was Lecturer in Therapeutics. In 1918 he was Examiner in Public Health. From the time of its inception in 1924, he was a member of the University Standing Committee of Convocation. His activities outside his practice did not end with his interest in the University of Melbourne. He was a member of the Council of the Victorian Centre of the St. John Ambulance Association from 1889 and was several times President. He was a member of the Central Council of the St. John Ambulance Association from its inception and a member of the Council of the Victorian Civil Ambulance Association from its inception and retired in 1928. He was made an Honorary Associate of the Order of St. John of Jerusalem in 1919, an Officer in 1926 and a Commander in

1929. He was a member of the Council of the Australian Health Society from 1901 and President from 1927 and was Honorary Treasurer and Chairman of the Executive of the Health Association of Australasia from 1923 to 1925. He was a member of the Felton Bequests Committee from its inception in 1904 and Chairman from 1910. He took a lively interest in the affairs of the Australian Red Cross Society; he was a member of the Central Council from its first meeting in 1915, a member of the Advisory Committee for Victoria and of the Council for the Victorian Division from 1915, Chairman of the Red Cross Rest Home Number 1 Committee during its whole existence from 1915 to 1919, Chairman of the Red Cross Voluntary Aid Detachment Committee for 1915, Acting Chairman of the Executive of the Victorian Division from 1926 to 1928. He was a member of the Joint Central and Joint Victorian Councils from their inception in 1928. He was a member of the Board of Management of the Heatherston Sanatorium. He was President of the Melbourne Medical Association in 1902. He took a keen interest in the affairs of his church, filling the office of vestryman of Christ Church, South Yarra, and he was a member of the Melbourne Diocesan Synod.

In spite of his activities in all these spheres Bage carried on for many years an active practice. He was interested particularly in the study of tuberculosis and he spent much time and energy in endeavouring to do something for sufferers from this disease. His chief hobbies were reading, gardening and carpentering. He delighted in landscape gardening—the garden of the Melbourne Grammar School is a monument to his planning. He was a keen student of languages and devoted himself to Greek, Latin and French literature to the day of his death. He had a great love for English literature. He applied himself to the study of art in all its branches and brought to the Felton Bequests Committee a wide knowledge. He wrote an historical record of the Felton Bequests. His friends whose personal tributes are appended bear witness to his personal qualities. Of Charles Bage it can be said that he served his day and generation, that the world was the better for his having lived in it and that he raised for himself a monument of affection in the hearts of those among whom he dwelt.

Dr. Felix Meyer writes:

Among my fellow students of the Melbourne Medical School Charles Bage appealed to me, as he must have done to his fellows, for his fine mental and physical qualities. His was a happy and harmonious combination of intellectual and bodily strength—the body of the

athlete with the well-balanced mind. He loved his work, he was fond of games—in just proportion. He carried himself well, there was an attractive dignity about him—his whole personality was attractive—and his voice had an uncommon charm. Truth and sincerity were stamped on his features—very pleasant features—and you felt the natural honesty of his nature. All through his life I feel it could be said of him: "He nothing common did, nor mean."

From his youth he was a lover of the arts and literature and he followed up his medical course by taking his Master of Arts degree. His range in general literature and the classics was wide. His judgements were sane and con-

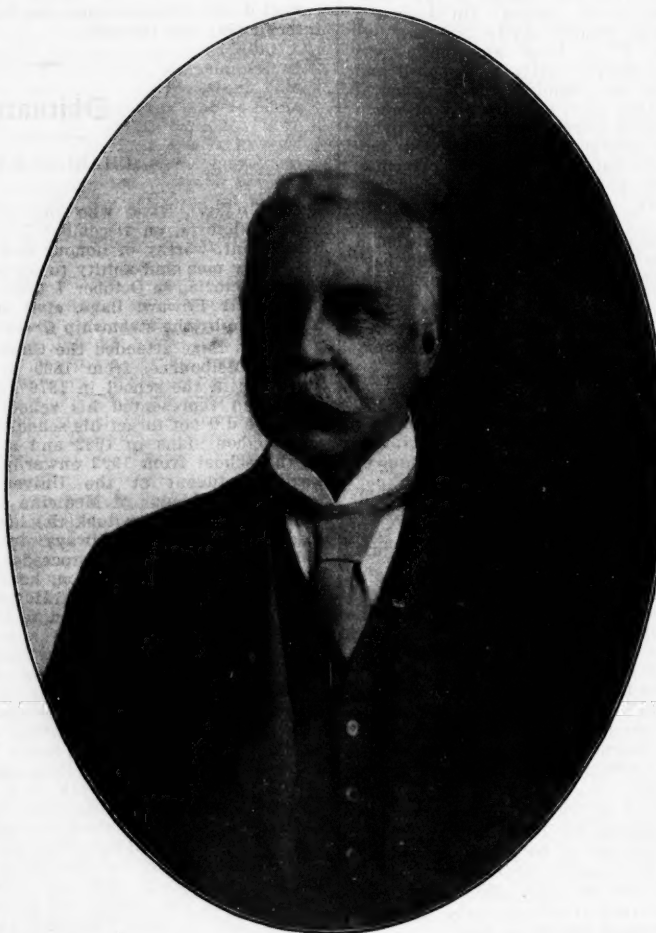
vincing. He could, when he chose, write excellent verse. These and kindred matters were among the things that brought us into closer and warmer relation as the years went by. He was always so frank in the expression of his ideas, so reasonable, so open-minded in regard to the other side of the question. He had the philosophic mind that comes with years and the humanities born of the Spirit. Life gave him much—he gave much in return.

Dr. E. Sandford Jackson writes:

The year 1877 saw a considerable increase in the number of students presenting themselves for their first year at the Melbourne Medical School. That year, if memory serves me correctly, there were approximately fifty lads in for their first year medicine. There were among them the remnants of the first year medicine of 1876, of which I was one and there was a number of new students fresh from the Melbourne public schools.

Amongst these were three who were destined to honour me with a friendship of which I have been justly proud. Fred Bird, George Syme, Charles Bage—all of whom have left their mark, and a big one, on the medical and surgical annals of their country. The two former have both passed over to the great majority some time ago and our grief at parting has just begun to lose something of the keenness of its edge. And now, to all those who knew him, comes the fresh sorrow which belongs to the thought that our very dear and loyal friend, Charles Bage, has gone and that we shall not meet again in this world.

It was forty-nine years ago this 3rd December since Syme, Bage and the writer saw their names posted as having been successful in the final year of studentship. Fred Bird was in England. Next year Fate sent me to Brisbane and has kept me there. So it has fallen out that I could only see my friend at long intervals, during my very occasional visits to Melbourne. But always Charles Bage, in his happy, gentle way, contrived to let me feel



and know that I was welcome; and always I knew that however far away from one another we were and however seldom our meetings, he was "*Semper idem, semper paratus*"—always the same and always ready to do anything he could to help his friend. So whenever I wanted information or advice on any subject of common interest a letter to Charles Bage brought speedy results and wise advice. Nothing was ever a trouble to him, if it should only help a friend.

In our student days his steady, cheerful, kindly ways made friends of all his fellows, while in turn he was a friend to all. I rejoice indeed that my friendship with him lasted for more than half a century with no thought or deed to interrupt it for a single moment.

I do not remember ever to have heard him tamper with the truth. His word was his bond on which the most absolute trust could rest. I do not remember ever to have seen him angry—scornful of the wrong, yes! But never impatient or angry, nor did I ever hear him speak ill of another.

In common, I am sure, with everyone else who had the privilege of his intimacy, I shall miss him as one whose place it will be difficult indeed to fill.

Dr. A. V. M. Anderson writes:

My acquaintance with Dr. Charles Bage began in 1885, when I was a student and he was Honorary Surgeon to the Melbourne Hospital, and continued practically without intermission up till the time of his death.

He began private practice in South Yarra and I saw a great deal of him while I was Resident Medical Officer at the Alfred Hospital and afterwards as a practitioner living quite close to him and associated with him in his work.

To me he always appeared as a type of the best kind of general practitioner. He was a graduate in arts as well as in medicine and possessed that culture and refinement so desirable in a professional man. He had a dignified but pleasant manner, a delicate sense of the humorous and at the same time an air of severity that won the confidence of both his patients and his professional *confrères*. He was very happy in his domestic as in his medical life and had a very wide range of interests outside as well as within the profession. In rendering these services he derived a great deal of pleasure and may be said to have lived a full and happy life. He had not been in good health for the past two years, but accepted his limitations with equanimity and cheerfulness. He continued his work persistently up till the last week of his life.

To his friends is left the memory of an able and conscientious physician who has rendered good and faithful service to his patients, to the profession and—in a much wider sphere than is permitted to most of us—to the community.

Correspondence.

LEPROSY.

SIR: In your issue of the 18th October there appears an article by Sir Leonard Rogers on the subject of leprosy prophylaxis in Australia. Sir Leonard refers to my statement made in 1927, that leprosy may be considered to have been brought under control by the existing prophylactic system in New South Wales, and proceeds to quote figures which to the unwary might convey the inference that my conclusion had not been confirmed by subsequent experience.

The paragraph to which I refer reads as follows:

He thought that leprosy was under control in New South Wales, but this is not altogether borne out by recent data, for in the seven years up to 1920 the total segregated cases varied between 20 and 24 and the yearly admissions averaged three; and from 1920 to 1927 the admissions numbered 26, an average of 3.25, and the decline in the total remaining to 17 at the end of 1927 was due to five repatriations and 15 deaths during that period.

Analysis of the admissions to Little Bay Lazaret subsequent to the preparation of my report in 1928, reveals that during the period quoted by Sir Leonard there were, excluding recurrences, 18 new cases. Of these only two may be considered to have been New South Wales infections. Of this pair one was a coloured boy from the Tweed District where contact with coloured lepers from Queensland is a recurrent possibility, and the other a white boy, the son of a leper previously isolated in New South Wales.

Leprosy prophylaxis in New South Wales is principally a matter of control in the white population. This being so, it is interesting to note that this case, the only white case of New South Wales origin reported since 1920, was of non-infectious form (no *Bacilli lepræ* were found) and was so mild in type that the patient was discharged as cured after eight months' isolation.

I think it is obvious that recent experience serves to confirm the view that leprosy is under control in New South Wales and this desirable objective having been reached by means of the existing prophylactic system, any radical variation of that system should only be undertaken on the basis of facts ascertained by critical analysis of all available data. In view of the results of analysis of Sir Leonard's figures, I personally am of the opinion that they do not justify any radical change in procedure in this State.

Yours, etc.,

CECIL COOK,

Chief Medical Officer,
North Australia Medical Service.

Darwin,

North Australia.

December 5, 1930.

WALDEMAR HAFFKINE, C.I.E.

SIR: So Haffkine is dead. How it carries one's thoughts back to the old days in India. What a wonder man he was! We talk of our Wrights, our Kochs, our David Bruces, but was one of them the peer of Haffkine?

I can recall Bombay, 1898, the old laboratory at Government House, Parel, Haffkine in the thick of his plague inoculation work, receiving scant encouragement from the Government. In those days I was in charge of Dhobi Talao, Khara Talao, Khumarwadi and Tanaswadi districts of the native city; moved on to Dharwar Southern Mahratta Country with the late Captain Leumann, I.M.S., who took control of the town of Hubli. We were both keen Haffkinites. The benefits of Haffkine's prophylactic against plague had not been tried out on a wholesale scale. The Government would not permit its use under compulsion, so we had to resort to strategy. Mr. Cappel was Commissioner of the district at that time. I can recall going to see him one afternoon at his headquarters in Dharwar and asking for permission to inoculate the inhabitants. He told me that was impossible. I then asked if I had the power to declare certain areas of Dharwar plague infected, and he said "Yes." My next question was: "Have I the right to evacuate those areas and to order the inhabitants into concentration camp?" He said: "Yes." "Well, then I will declare area B plague infected, and the inhabitants will be ordered into concentration camp. Any inhabitant who comes forward for dual inoculation (that is at an interval of one week between each inoculation) will be permitted to remain in the plague infected area, but no inhabitant who has left that area will be permitted to return to it until he has been subjected to dual inoculation." By this means we avoided actual compulsion in the eyes of the Government, but procured practical inoculation on a wholesale scale. We used to inoculate 500 or more every morning at the rate of 120 an hour. Leumann adopted the same tactics in Hubli, and soon we were able to demonstrate on a wholesale scale the benefits of inoculation protection against plague and the lessening, to the individual of the risk of fatality should he contract plague later on. At that time in Dharwar was Dr. Alice Corthorn, C.S.I., who did excellent work amongst the women folk,

and also Dr. Ernest Hill who, like Dr. Leumann, afterwards followed me to Africa, and when last I heard of him was Health Officer of Natal.

Haffkine a C.I.E! If Haffkine had been the destroyer of lives in millions instead of the preserver of life he would have received a peerage and a substantial Government grant. I think I am right in saying that Haffkine was a Swiss or of Swiss extraction. I know we often wondered why he had never received due honour from our country. Or was it modesty on his part? What a mistake it is these days to be the protector of human life and not the destroyer.

Yours, etc.,

R. W. HORNABROOK.

120, Collins Street, Melbourne,
December 16, 1930.

SPRUE AND AMÆBIC DYSENTERY.

SIR: In the issue of THE MEDICAL JOURNAL OF AUSTRALIA of December 20, 1930, there appears a report of a case of sprue complicated by amœbic dysentery. It is, of course, well known that amœbic dysentery may be a precursor of sprue, but to my mind Drs. Crawford and Gutteridge, who report the case, do not provide sufficiently convincing evidence that their patient was suffering from sprue. They make no mention of any abdominal signs, such as diminished liver dulness or swelling; again, the stools of their patient were said to be tan coloured, whereas sprue stools are usually greyish and contain an excess of fat; no mention is made in the report of an analysis of the stools nor an estimation of the blood fats. One would like some further information on the following points: (i) The appearance of the skin, (ii) abnormalities in the abdomen, (iii) the composition of the stools, (iv) the diet.

The value of blood transfusion in the treatment of sprue anemia has recently been proved by Manson Bahr; the claim of Drs. Crawford and Gutteridge that their patient was cured by the administration of emetine bismuth iodide and transfusion of blood is therefore extremely interesting. It would be a pity if they allowed this case to pass without providing some further details.

Yours, etc.,

W. L. CALOV.

Sydney,
December 22, 1930.

THE HOSPITAL PROBLEM.

SIR: You write in the first issue of the journal this year that Dr. David Embelton's able contribution did not evoke discussion. Such failure to provide discussion on this subject (and others of extreme importance) by the members of the British Medical Association seems to indicate either that it has received very little thought or that there has been very little cooperative effort to acquaint the members of the Association with the facts of the Hospital Problem.

Dr. Embelton certainly deserves well of the members of the Association for the trouble he has taken to place so many facts in this symposium, and in other contributions, before them.

With all due deference, one would like to make some comments on the alternative plan of insurance (Part V) and other matters of great interest.

One may say at the outset that the scheme is ideal in theory. How will it work out in practice? One is firmly convinced that no government in Australia would be willing to impose on the general public statutory liability of one shilling per week for a sickness benefit scheme, to say nothing of the cost of administration. One needs to remember that the medical profession is a popular Aunt Sally.

In addition to governmental opposition, it is likely that there would be opposition to such a scheme from within the profession; one reason for this would probably be the grave danger that many people able to pay private fees would take advantage of the scheme unfairly.

Another objection would be that it is too sudden an innovation and that it would be impossible to foresee how the scheme would work out in practice.

Some plan designed upon a more gradual mode of progress might be better. Apparently the medical profession in Queensland agrees with such an attitude. One principle put forward by the Queensland Branch of the British Medical Association has been that all classes of the community should assist in the upkeep of hospitals. It is interesting to note that the Royal Commission, who have lately presented their report, have urged the Government that this principle should apply in financing hospitals and that the contribution from wage earners is to be one penny in the pound of the wages.

The fact of making this payment gives no right to hospital treatment in the opinion of the Royal Commissioners.

At the moment in Queensland it is the policy of the British Medical Association to provide honorary service at public hospitals. The question might be fairly asked whether this system should continue, as in the future the Government will provide maintenance in hospital for the necessitous sick. It is possible that the best system would be one of a paid resident medical staff and a paid consulting staff as in some municipal hospitals in England.

Before answering these questions and those of Dr. Embelton, a thorough discussion of the problem and interchange of ideas between the members of the profession and laymen interested in the question is necessary. The time is opportune for the convening of a meeting on the subject.

If the British Medical Association does not give a lead in this matter, it will certainly, in Dr. Embelton's words, be beached politically.

Yours, etc.,

E. S. MEYERS.

Brisbane, January 4, 1931.

THE WAR AND SIR NEVILLE HOWSE'S PART THEREIN.

SIR: After carefully reading Dr. Springthorpe's letter and knowing something of the inner history of the medical services in Egypt before and during the Gallipoli campaign, my first thought was that it was unfortunate that Sir Neville Howse was not alive to reply to the accusations contained therein. On second thoughts, I am sure he would not have replied or wished anyone to reply for him, being quite content to allow his work for Australia in the A.I.F. to be judged on its merits.

Everyone should read Graham Butler's masterly survey of the Australian Army Medical Services in the official history just published.

Yours, etc.,

ARCHIE ASPINALL.

February, 1931.

THE FEES OF SPECIALISTS.

SIR: The letter by "G.P." in the current issue of THE MEDICAL JOURNAL OF AUSTRALIA raises the question which one often hears: "Why is a specialist better paid than a general practitioner?"

As a matter of fact many general practitioners make large salaries, whilst most specialists make much less than is supposed. And in many cases the answer to the question would be: "He is not." However, as a specialist,

I mention a few of the conditions which force us to charge a higher rate than general practitioners.

1. *Time factor:* (a) A consultant must charge a fee which will allow him time to examine cases with such thoroughness that he is unlikely to make mistakes through rushed work. If his practice still increases, he should refuse work directly or by the more lucrative and less offensive method of raising his fees. (b) Study and research. All medical men should study, but consultants must keep abreast of their literature or quickly become "back numbers." Many give up much time to research which they could utilize in earning fees. (c) Free hospital appointments. These make a serious drain on the time of a specialist. There are world-renowned men who have but an hour a day for private practice and their fees must necessarily be very high. (d) Teaching appointments.

2. *Training factors:* Not every specialist nor every general practitioner has been trained to the best standards. One can only compare fully trained specimens of each. A specialist should first have the full preliminary training of a general practitioner; he should then have had a training which would enable him to set up as a general consultant and, lastly, if he is to practise a small special branch he should spend some years at this. In the course of such studies he will probably have spent some time in obtaining some higher qualifications. It is only by a sound preliminary training that the absurdity of the specialist who cannot see outside his specialty can be avoided. Further, unless an oral surgeon has had a training in orthopaedic principles, how can he be fully equipped to deal with fractures of the mandible? Or unless an oto-rhino-laryngologist has been trained in the practice of plastic surgery, local anaesthesia, electro-therapy *et cetera*, how can he be said to be well equipped for his work?

3. *The development of a specialist's practice:* A specialist's practice is such a personal affair that it has to be built up from nothing. Such practices often grow slowly, during which the principal may for years be living at a loss, whilst he is at the same time working at study, research and hard and often thankless spade work at the public hospitals for his seniors. The best class of consultant, such as becomes an honorary on the staff of the large London teaching hospitals, unless more or less independent to commence with, frequently reaches the age of forty or forty-five before becoming self-supporting after having passed through an Odyssey of toil.

The question now arises as to whether a reduction in the specialist's fee is advisable or possible. If the fees were greatly reduced there would be a tendency to rush work or to give up hospital appointments. Certainly a system of paid staffs on all hospitals should enable consultants' fees to drop with benefit to all.

I agree that general practitioners are often badly paid. They work long hours, do much for the necessitous poor, free of charge (as we do, only at more awkward hours) and often when they have what might prove interesting cases they are too rushed to investigate them fully and to reap that reward which comes from interest in one's work.

There is much spade work and someone must do it, but those with ambition can, if they wish it, produce a healthier state of affairs. By making time to keep thoroughly up to date with their work, by making time to give each new case a very comprehensive overhaul and every old one that needs it, one also, those with ambition can also afford to raise their fees and be better paid for the work done. Their practice would be smaller, but their reputation would not suffer and they would attract the better patients.

Australians are astounded when I tell them of conditions which obtained in England six years ago and which, I expect, continue. There were doctors who ran what were considered good middle class practices who consulted at the surgery for two shillings and sixpence or three shillings and sixpence, or at the patients' houses for three shillings and sixpence or five shillings. These fees included medicine. There were also poor class dispensary practices where the doctor handed out bottles of medicine

and accepted one shilling and sixpence or two shillings in a minimum of time. Patients in these practices often resented examination, believing a clever doctor could diagnose by sight alone. To make a living on these fees men had to work so hard that study was impossible and many were grossly out of date. If their patients needed operations they either went to the hospital or got well-known consultants to come down to operate. These surgeons often brought their own anaesthetist and assistant in order to avoid the risk of a bungler giving a bad anaesthetic or spoiling the asepsis. Often under these conditions the general practitioner did not trouble to be present and as hospital appointments were kept for the specialist, he did not at times see operations for long periods. In fact as time went on he tended to lose heart and only to continue his drudgery to provide for his family. In Australia I was pleased to find that the general practitioner was generally keen on his work, and that he saw or did enough operative surgery to keep him a good anaesthetist and a good assistant whose asepsis was reliable. His knowledge was kept fresher by his easier life giving him more time to apply it to his cases. He was, on the whole, much better paid than his England *confrère*. He also could often get a little leisure, though I still think he works much too hard and could improve his status on the lines I laid down.

In closing, I would suggest that consultants' fees will adjust themselves to the law of supply and demand, but that a matter of more importance to the profession as a whole would be the consideration of an attempt to increase the fees of general practitioners, who, though they often ask questions such as does "G.P.," are really generally only friendly rivals of the misunderstood specialist.

Yours, etc.,

A. B. K. WATKINS.

Bolton Street, Newcastle,
January 21, 1931.

IRRADIATED ERGOSTEROL.

SIR: In the article appearing in the journal of December 20, on "Vitamin D Administration in Parathyroid Deficiency Following Thyroidectomy," the statement appears that: "Irradiated ergosterol possesses 200,000 times the antirachitic activity of good cod liver oil; thus five grammes (about one-sixth of an ounce) of it are the equivalent of a ton of cod liver oil." This refers to the immediate product of the exposure of ergosterol to ultra-violet irradiation. The material used in the treatment of the cases reported was the British Drug Houses' "Solution of Radiostol," which is a standardized product containing 10,000 antirachitic units of vitamin D per cubic centimetre.

Yours, etc.,

F. S. HANSMAN.

143, Macquarie Street,
January 21, 1931.

ELECTRO-SURGERY OF THE TONSILS.

SIR: I was very glad to read McKenzie's warning in *The Lancet* about the danger of trying to remove tonsils quickly by diathermy. Now that the operation is coming into favour may I also urge that you cannot do too little at the first sitting. It is wise to give the patient confidence in the new treatment, and also, by causing thrombosis in the vessels, it will eliminate any danger of hæmorrhage. The more experience I have of this method, the more convinced I am of its usefulness and general applicability. There still seems a distrust in some minds because seldom is the whole tonsil removed. I deliberately do not completely remove it because I am convinced it is quite unnecessary. On the other hand, it is very easy to do so if you wish.

Yours, etc.,

W. KENT HUGHES.

22, Collins Street, Melbourne,
January 12, 1931.

NOTICE.

PROFESSOR W. S. DAWSON has asked us to announce that a meeting will be held at the British Medical Association House, Macquarie Street, Sydney, on February 12, 1931, at 4.30 p.m., in order that medical practitioners might be given an opportunity to express sympathy with Dr. Chisholm Ross. Sir Alexander MacCormick will act as chairman of the meeting.

Books Received.

INTESTINAL TOXEMIA (AUTOINTOXICATION) BIOLOGICALLY CONSIDERED, by A. Bassler, M.D., F.A.C.P.; 1930. Philadelphia: F. A. Davis Company. Royal 8vo., pp. 446, illustrated with 16 text-cuts.

THE ANATOMY OF THE FEMALE PELVIS, DESCRIPTIVE AND APPLIED, by F. A. Maguire, D.S.O., M.D., Ch.M., F.R.C.S., F.C.S.A.; Second Edition; 1929. Sydney: Angus and Robertson Limited. Crown 8vo., pp. 120.

TECHNIQUE AND RESULTS OF GRAFTING SKIN, by H. K. Christie, M.S., F.R.C.S.; 1930. London: H. K. Lewis and Company Limited; Sydney: Angus and Robertson. Demy 8vo., pp. 79, with 35 illustrations.

BAILLIÈRE'S SYNTHETIC ANATOMY. A SERIES OF DRAWINGS ON TRANSPARENT SHEETS FOR FACILITATING THE RECONSTRUCTION OF MENTAL PICTURES OF THE HUMAN BODY, by J. E. Cheesman: Part VII (The Thorax) and Part VIII (The Abdomen); 1930. London: Baillière, Tindall and Cox. Crown 4to. Price: 3s. each.

ANNALS OF ROENTGENOLOGY: A SERIES OF MONOGRAPHIC ATLASES, Edited by James T. Case, M.D.; Volume XII: The Chest in Children, by E. G. Stoloff, M.D.; 1930. New York: Paul B. Hoeber. Demy 4to., pp. 462, with 406 Roentgen-ray studies and 19 clinical illustrations. Price: \$15.00 net.

Medical Appointments.

Dr. A. J. Collins (B.M.A.) has been appointed a member of the Board to Control the Campaign against Tuberculosis, New South Wales.

Dr. A. A. Lendon (B.M.A.) has been reappointed as President of the Medical Board of South Australia.

Dr. K. H. Tepper (B.M.A.) has been appointed Medical Officer of Health by the Cottesloe Beach Road Board, Western Australia.

Dr. V. P. Johnson (B.M.A.) has been appointed Acting Medical Superintendent of the Hospital for the Insane and the Receiving House, Ballarat, Victoria, pursuant to the provisions of the *Lunacy Act* 1928, dating from January 19, 1931.

Dr. W. de W. Henty (B.M.A.) has been appointed Acting Medical Superintendent of the Hospital for the Insane, Ararat, Victoria, pursuant to the provisions of the *Lunacy Act* 1928, dating from January 8, 1931.

Dr. K. R. Moore (B.M.A.) has been appointed a Commissioner for Declarations under the provisions of the *Statutory Declarations Act* 1911-1922.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xvi.

CAMOOWEAL HOSPITAL, CAMOOWEAL, NORTH QUEENSLAND: Medical Officer.

ROYAL ARMY MEDICAL CORPS: Medical Officers.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Clinical Assistant to the Surgical Outdoor Department.

THE BENEVOLENT SOCIETY OF NEW SOUTH WALES: Honorary Vacancies.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1

BRANCH.	APPOINTMENTS.
	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmalm United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phoenix Mutual Provident Society.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members desiring to accept appointment in ANY COUNTRY HOSPITAL, are advised to submit a copy of their agreement to the Council before signing, in their own interests. Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Hospital. Mount Isa Mines.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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